

PCTWORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C07D 207/34, 233/90, A61K 31/415, C07D 403/14, C12Q 1/68		A1	(11) International Publication Number: WO 98/37067 (43) International Publication Date: 27 August 1998 (27.08.98)
(21) International Application Number: PCT/US98/01714		US	60/043,444 (CIP) Filed on 8 April 1997 (08.04.97)
(22) International Filing Date: 29 January 1998 (29.01.98)			
(30) Priority Data: PCT/US97/03332 20 February 1997 (20.02.97) WO		(71) Applicant (<i>for all designated States except US</i>): CALIFORNIA INSTITUTE OF TECHNOLOGY [US/US]; 1200 East California Boulevard, Pasadena, CA 91125 (US).	
(34) Countries for which the regional or international application was filed: US et al. 60/043,444 8 April 1997 (08.04.97) US 60/042,022 16 April 1997 (16.04.97) US 08/837,524 21 April 1997 (21.04.97) US 08/853,522 8 May 1997 (08.05.97) US PCT/US97/12722 21 July 1997 (21.07.97) WO		(72) Inventors; and (75) Inventors/Applicants (<i>for US only</i>): BAIRD, Eldon, E. [US/US]; 255 S. Madison Avenue #5, Pasadena, CA 91101 (US). DERVAN, Peter, B. [US/US]; 1235 St. Albans Road, San Marino, CA 91108 (US).	
(34) Countries for which the regional or international application was filed: US et al.		(74) Agent: McDONNELL, John, J.; McDonnell Boehnen Hulbert & Berghoff, 300 South Wacker Drive, Chicago, IL 60606 (US).	
(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Applications US 08/853,522 (CIP) Filed on 8 May 1997 (08.05.97) US 08/837,524 (CIP) Filed on 21 April 1997 (21.04.97) US 08/607,078 (CIP) Filed on 26 February 1996 (26.02.96) US 60/042,022 (CIP) Filed on 16 April 1997 (16.04.97)		(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
Published <i>With international search report.</i>			
(54) Title: DESIGN, SYNTHESIS AND USE OF SPECIFIC POLYAMIDE DNA-BINDING LIGANDS			
(57) Abstract			
<p>The invention encompasses improved selective polyamides for binding to specific nucleotide sequences of double stranded DNA as well as methods for designing and synthesizing polyamide DNA binding ligands that are selective for an identified specific nucleotide sequence. The 3-hydroxy-N-methylpyrrole/N-methylpyrrole carboxamide pair specifically recognizes the T.A base pair, while the N-methylpyrrole/3-hydroxy-N-methylpyrrole pair recognizes A.T nucleotide pairs. Similarly, an N-methylimidazole/N-methylpyrrole carboxamide pair specifically recognizes the G.C nucleotide pair, and the N-methylpyrrole/N-methylimidazole carboxamide pair recognizes the C.G nucleotide pair.</p>			

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

DESIGN, SYNTHESIS AND USE OF SPECIFIC
POLYAMIDE DNA-BINDING LIGANDS

5 The U.S. Government has certain rights in this invention pursuant to Grant Nos. GM 26453, 27681 and 47530 awarded by the National Institute of Health.

CROSS REFERENCE TO RELATED APPLICATIONS

10 This application is a continuation-in-part of PCT/US97/03332 filed February 20, 1997, Serial No. 08/853,522 filed May 8, 1997 and PCT/US 97/12722 filed July 21, 1997 which are continuation-in-part applications of Serial No. 08/837,524, filed April 21, 1997, Serial No. 08/607,078, filed February 26, 1996, provisional application Serial No. 60/042,022, filed April 16, 1997 and provisional application Serial No. 60/043,444, filed April 8, 1997.

15 **BACKGROUND OF THE INVENTION**

Field of the Invention

20 This invention relates to polyamides which bind to predetermined sequences in the minor groove of double stranded DNA.

Description of the Related Art

25 The design of synthetic ligands that read the information stored in the DNA double helix has been a long standing goal of chemistry. Cell-permeable small molecules which target predetermined DNA sequences are useful for the regulation of gene-expression. Oligodeoxynucleotides that recognize the major groove of double-helical DNA via triple-helix formation bind to a broad range of sequences with high affinity and specificity. Although 30 oligonucleotides and their analogs have been shown to interfere with gene expression, the triple helix approach is limited to purine tracks and suffers from poor cellular uptake. The development of pairing rules for minor groove binding polyamides derived from N-methylpyrrole (Py) and N-methylimidazole (Im) amino acids provides another code to control sequence specificity. An Im/Py pair distinguishes G•C from C•G and both of these from A•T or 35 T•A base pairs. Wade, W.S., Mrksich, M. & Dervan, P.B. describes the design of peptides that bind in the minor groove of DNA at 5'-(A,T)G(A,T)C(A,T)-3' sequences by a dimeric side-by-side motif. *J. Am. Chem. Soc.* 114, 8783-8794 (1992); Mrksich, M. *et al.* describes antiparallel

-2-

side-by-side motif for sequence specific-recognition in the minor groove of DNA by the designed peptide 1-methylimidazole-2-carboxamidenetropsin. *Proc. Natl. Acad. Sci. USA* **89**, 7586-7590 (1992); Trauger, J.W., Baird, E. E. Dervan, P.B. describes the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* **382**, 559-561 (1996). A Py/Py pair specifies A•T from G•C but does not distinguish A•T from T•A. Pelton, J.G. & Wemmer, D.E. describes the structural characterization of a 2-1 distamycin A-d(CGCAAATTCGGC) complex by two-dimensional NMR. *Proc. Natl. Acad. Sci. USA* **86**, 5723-5727 (1989); White, S., Baird, E. E. & Dervan, P.B. Describes the effects of the A•T/T•A degeneracy of pyrrole-imidazole polyamide recognition in the minor groove of DNA. *Biochemistry* **35**, 12532-12537 (1996); White, S., Baird, E. E. & Dervan, P. B. describes the pairing rules for recognition in the minor groove of DNA by pyrrole-imidazole polyamides. *Chem. & Biol.* **4**, 569-578 (1997); White, S., Baird, E. E. & Dervan, P.B. describes the 5'-3' N-C orientation preference for polyamide binding in the minor groove. New methods of designing selective compounds and the resulting specific polyamide binding ligands that are designed to target an identified sequence of double stranded DNA are needed to overcome the A•T/T•A degeneracy of pyrrole-imidazole polyamide recognition.

SUMMARY OF THE INVENTION

20

It has been found that a new aromatic amino acid, 3-hydroxy-N-methylpyrrole (Hp) when incorporated into a polyamide and paired opposite Py, provides the means to discriminate A•T from T•A. Unexpectedly, the replacement of a single hydrogen atom on the pyrrole with a hydroxy group in a Hp/Py pair regulates the affinity and the specificity of a polyamide by an order of magnitude. Utilizing Hp together with Py and Im in polyamides to form four aromatic amino acid pairs (Im/Py, Py/Im, Hp/Py, and Py/Hp) provides a code to distinguish all four Watson-Crick base pairs in the minor groove of DNA.

30

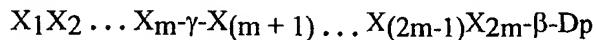
The present invention provides a method for designing specific polyamides suitable for use as DNA-binding ligands, as well as compositions comprising such polyamides, that are selective for an identified target sequence of double stranded DNA. Preferably, the designed specific polyamides are characterized by a dissociation constant of less than 1 nM, as measured by DNase I footprint titration, and greater than ten-fold selectivity for the identified target

sequence over related mismatch sequences, based on the ratio of the corresponding dissociation constants measured by DNase I footprint titrations.

The invention encompasses improved polyamides for binding to the minor groove of double stranded ("duplex") DNA. The polyamides are in the form of a hairpin comprising two groups of at least three consecutive carboxamide residues, the two groups covalently linked by an aliphatic amino acid residue, preferably γ -aminobutyric acid or 2,4 diaminobutyric acid, the consecutive carboxamide residues of the first group pairing in an antiparallel manner with the consecutive carboxamide residues of the second group in the minor groove of double stranded DNA. The improvement relates to the inclusion of a binding pair of Hp/Py carboxamides in the polyamide to bind to a T•A base pair in the minor groove of double stranded DNA or Py/Hp carboxamide binding pair in the polyamide to bind to an A•T base pair in the minor groove of double stranded DNA. The improved polyamides have at least three consecutive carboxamide pairs for binding to at least three DNA base pairs in the minor groove of a duplex DNA sequence that has at least one A•T or T•A DNA base pair, the improvement comprising selecting a Hp/Py carboxamide pair to correspond to a T•A base pair in the minor groove or a Py/Hp carboxamide pair to bind to an A•T DNA base pair in the minor groove. Preferably the binding of the carboxamide pairs to the DNA base pairs modulates the expression of a gene.

In general, the method provides specific polyamides suitable for use as DNA-binding ligands that are selective for identified target sequences of double stranded DNA having a coding strand sequence of the form 5'-WN₁N₂ . . . N_mW-3' where N is a nucleotide chosen from the group A, T, C and G, W is a nucleotide chosen from the group A and T, and with the corresponding paired antiparallel strand 3'-W'N'₁N'₂ . . . N'_mW'-5' where N' is a nucleotide chosen from the group T, A, G and C respectively to form Watson-Crick base pairs, W is a nucleotide chosen from the group T and A respectively to form Watson-Crick base pairs, and m is an integer having a value from 3 to 6 inclusive.

The preferred corresponding designed specific polyamides resulting from this invention are of the form



wherein X₁, X₂, X_m, X_(m+1), X_(2m-1), and X_{2m} are carboxamide residues forming carboxamide binding pairs X₁/X_{2m}, X₂/X_(2m-1), X_m/X_(m+1), and γ is γ -aminobutyric acid or 2,4 diaminobutyric acid and D_p is dimethylaminopropylamide,

-4-

and where

carboxamide binding pair X_1/X_{2m} corresponds to base pair $N_1 \bullet N'_1$,
carboxamide binding pair $X_2/X_{(2m-1)}$ corresponds to base pair $N_2 \bullet N'_2$,
carboxamide binding pair $X_m/X_{(m+1)}$ corresponds to base pair $N_m \bullet N'_m$.

5

In general, the specific polyamide DNA-binding ligands were designed by using a method that comprises the steps of identifying the target DNA sequence $5'-WN_1N_2 \dots N_mW-3'$; representing the identified sequence as $5'-Wab \dots xW-3'$, wherein a is a first nucleotide to be bound by the X_1 carboxamide residue, b is a second nucleotide to be bound by the X_2 carboxamide residue, and x is the corresponding nucleotide to be bound by the X_m carboxamide residue; defining a as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified six base pair sequence.

10

Carboxamide residues were selected sequentially as follows: Im was selected as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if a was G. Py was selected as the X_1 carboxamide residue and Im as the X_{2m} carboxamide residue if a was C. Hp was selected as the X_1 carboxamide residue and Py as the X_{2m} carboxamide residue if a was T. Py was selected as the X_1 carboxamide residue and Hp as the X_{2m} carboxamide residue if a was A.

15

The remaining carboxamide residues were selected in the same fashion. Im was selected as the X_2 carboxamide residue and Py as the X_{2m-1} carboxamide residue if b was G. Py was selected as the X_2 carboxamide residue and Im as the X_{2m-1} carboxamide residue if b was C. Hp was selected as the X_2 carboxamide residue and Py as the X_{2m-1} carboxamide residue if b was T. Py was selected as the X_2 carboxamide residue and Hp as the X_{2m-1} carboxamide residue if b was A.

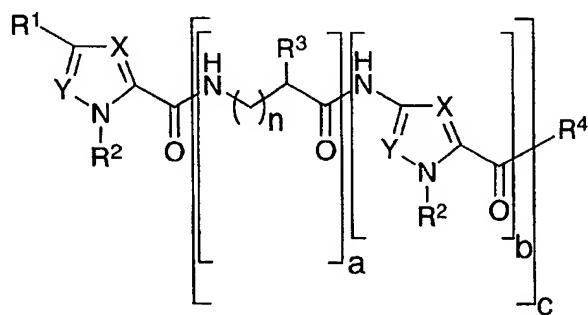
20

The selection of carboxamide residues was continued through m iterations. In the last iteration, Im was selected as the X_m carboxamide residue and Py as the X_{m+1} carboxamide residue if x was G. Py was selected as the X_m carboxamide residue and Im as the X_{m+1} carboxamide residue if x was C. Hp was selected as the X_m carboxamide residue and Py as the X_{m+1} carboxamide residue if x was T. Py was selected as the X_m carboxamide residue and Hp as the X_{m+1} carboxamide residue if x was A.

30

In one preferred embodiment, the polyamide includes at least four consecutive carboxamide pairs for binding to at least four base pairs in a duplex DNA sequence. In another 5 preferred embodiment, the polyamide includes at least five consecutive carboxamide pairs for binding to at least five base pairs in a duplex DNA sequence. In yet another preferred embodiment, the polyamide includes at least six consecutive carboxamide pairs for binding to at least six base pairs in a duplex DNA sequence. In one preferred embodiment, the improved polyamides have four carboxamide binding pairs that will distinguish A•T, T•A, C•G and G•C 10 base pairs in the minor groove of a duplex DNA sequence. The duplex DNA sequence can be a regulatory sequence, such as a promoter sequence or an enhancer sequence, or a gene sequence, such as a coding sequence or a non-coding sequence. Preferably, the duplex DNA sequence is a promoter sequence.

15 More specifically, "polyamide" refers to a polymer of polyamide subunits of the formula.



where R^1 is chosen from H, NH₂, SH, Cl, Br, F, N-acetyl, or N-formyl.

where R^2 is C₁₋₁₀₀ alkyl (preferably C₁₋₁₀ alkyl such as methyl, ethyl, isopropyl), C₁₋₂₀ 100 alkylamine (preferably C₁₋₁₀ alkylamine such as ethylamine), C₁₋₁₀₀ alkyldiamine (preferably C₁₋₁₀ alkyldiamine such as N,N-dimethylpropylamine), a C₁₋₁₀₀ alkylcarboxylate (preferably a C₁₋₁₀ alkylcarboxylate such as -CH₂COOH), C₁₋₁₀₀ alkenyl (preferably C₁₋₁₀ alkenyl such as CH₂CH=CH₂), or a C₁₋₁₀₀ alkynyl (preferably C₁₋₁₀ alkynyl such as -CH₂C≡CH₃), or a C₁₋₁₀₀L, where L groups can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, 25

-6-

5 captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)- α -tocopheral. Most preferably R² is H, (CH₂)_mCH₃, (CH₂)_mNH₂, (CH₂)_mSH, (CH₂)_mOH, (CH₂)_mNR⁵₂, (CH₂)_mOR⁵, (CH₂)_mSR⁵, where R⁵ = (CH₂)_mCH₃, (CH₂)_mNH₂, (CH₂)_mSH, (CH₂)_mOH and m is an integer from 0 to 6.

where R³ is chosen from H, NH₂, OH, SH, Br, Cl, F, OMe, CH₂OH, CH₂SH, CH₂NH₂.

10 where R⁴ is -NH(CH₂)₀₋₁₀₀NR⁶R⁷ or NH(CH₂)_pCO NH(CH₂)₀₋₁₀₀NR⁶R⁷ or NHR⁶ or NH(CH₂)_pCONHR⁶. Where R⁶ and R⁷ are independently chosen from H, Cl, NO, N-acetyl, benzyl, C₁₋₁₀₀ alkyl, C₁₋₁₀₀ alkylamine, C₁₋₁₀₀ alkyldiamine, C₁₋₁₀₀ alkylcarboxylate, C₁₋₁₀₀ alkenyl, a C₁₋₁₀₀ alkynyl, or a C₁₋₁₀₀L, where L groups can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, an oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)- α -tocopheral. Where p is an integer value ranging from 0 to 12. In the preferred form of the present invention R⁶ and R⁷ are H, and the resulting amine modified polyamide is coupled to an amine reactive molecule in order to generate a bifunction polyamide conjugate. Where the amine reactive molecule is chosen from but not limited to the following: arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, an oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)- α -tocopheral.

25 where X and Y are chosen from the following, N, CH, COH, CCH₃, CNH₂, CCl, CF.

a is an integer chosen from values of 0 or 1

b is an integer chosen integer values ranging from 1 to 5.

c is an integer value ranging from 2 to 10.

30 Hereinafter, N-methylpyrrolecarboxamide may be referred to as "Py", N-methylimidazolecarboxamide may be referred to as "Im", γ -aminobutyric acid may referred to as " γ ", β -alanine may be referred to as " β ", glycine may be referred to as "G",

dimethylaminopropylamide may be referred to as "Dp", and ethylenediaminetetraacetic acid may be referred to as "EDTA":

The preparation and the use of polyamides for binding in the minor groove of double stranded DNA are extensively described in the art. This invention is an improvement of the existing technology that uses 3-hydroxy-N-methylpyrrole to provide carboxamide binding pairs for DNA binding polyamides.

The invention encompasses polyamides having γ -aminobutyric acid or a substituted γ -aminobutyric acid to form a hairpin with a member of each carboxamide pairing on each side of it. Preferably the substituted γ -aminobutyric acid is a chiral substituted γ -aminobutyric acid such as (R)-2,4-diaminobutyric acid. In addition, the polyamides may contain an aliphatic amino acid residue, preferably a β -alanine residue, in place of a Hp or Py carboxamide. The β -alanine residue is represented in formulas as β . The β -alanine residue becomes a member of a carboxamide binding pair. The invention further includes the substitution as a β/β binding pair for non-Im containing binding pair. Thus, binding pairs in addition to the Im/Py, Py/Im, Hp/Py and Py/Hp are Im/ β , β /Im, Py/ β , β /Py, Hp/ β , β /Hp, and β/β .

The polyamides of the invention can have additional moieties attached covalently to the polyamide. Preferably the additional moieties are attached as substituents at the amino terminus of the polyamide, the carboxy terminus of the polyamide, or at a chiral (R)-2,4-diaminobutyric acid residue. Suitable additional moieties include a detectable labeling group such as a dye, biotin or a hapten. Other suitable additional moieties are DNA reactive moieties that provide for sequence specific cleavage of the duplex DNA.

25

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates the structure of polyamide 1, 2, and 3.

30 Figure 2 illustrates the pairing of polyamides to DNA base pairs.

Figure 3 illustrates the DNase footprint titration of compounds 2 and 3.

- Figure 4 illustrates a list of the structures of representative Hp containing polyamides.
- Figure 5 schematically illustrates a method for the design of eight carboxamide residue hairpin polyamide compounds suitable for recognition of 6-bp 5'-WNNNNW-3' sequences in the minor groove of double stranded DNA.
- 5 Figure 6 schematically illustrates a method for determining the position of an aromatic amino acid residue that should be replaced with a β -alanine residue in order to enhance the DNA binding properties of certain eight carboxamide residue hairpin polyamide compounds.
- Figure 7 schematically illustrates a method for the design of ten carboxamide residue hairpin polyamide compounds suitable for recognition of 7-bp 5'-WNNNNNW-3' sequences in the minor groove of double stranded DNA.
- 10 Figure 8 schematically illustrates a method for determining the position of an aromatic amino acid residue that should be replaced with a β -alanine residue in order to enhance the DNA binding properties of certain ten carboxamide residue hairpin polyamide compounds.
- Figure 9 schematically illustrates a method for determining the position of an additional aromatic amino acid residue that should be replaced with a β -alanine residue in order to enhance the DNA binding properties of certain ten carboxamide residue hairpin polyamide compounds.
- 15 Figure 10 schematically illustrates a method for the design of twelve carboxamide residue hairpin polyamide compounds suitable for recognition of 8-bp 5'-WNNNNW-3' sequences in the minor groove of double stranded DNA.
- Figure 11 schematically illustrates a method for determining the position of an aromatic amino acid residue that should be replaced with a β -alanine residue in order to enhance the DNA binding properties of certain twelve carboxamide residue hairpin polyamide compounds.
- 20

DETAILED DESCRIPTION OF THE INVENTION

25

Within this application, unless otherwise stated, definitions of the terms and illustration of the techniques of this application may be found in any of several well-known references such as: Sambrook, J., et al., *Molecular Cloning: A Laboratory Manual*, Cold Spring Harbor Laboratory Press (1989); Goeddel, D., ed., *Gene Expression Technology, Methods in Enzymology*, 185, Academic Press, San Diego, CA (1991); "Guide to Protein Purification" in Deutshcer, M.P., ed., *Methods in Enzymology*, Academic Press, San Diego, CA (1989); Innis, et al., *PCR Protocols: A Guide to Methods and Applications*, Academic Press, San Diego, CA (1990); Freshney, R.I., *Culture of Animal Cells: A Manual of Basic Technique*, 2nd Ed., Alan Liss, Inc. New York, NY (1987); Murray, E.J., ed., *Gene Transfer and Expression Protocols*, pp. 30 109-128, The Humana Press Inc., Clifton, NJ and Lewin, B., *Genes VI*, Oxford University Press, 35 New York (1997).

For the purposes of this application, a *promoter* is a regulatory sequence of DNA that is involved in the binding of RNA polymerase to initiate transcription of a gene. A *gene* is a segment of DNA involved in producing a peptide, polypeptide or protein, including the coding region, non-coding regions preceding ("leader") and following ("trailer") the coding region, as well as intervening non-coding sequences ("introns") between individual coding segments ("exons"). Coding refers to the representation of amino acids, start and stop signals in a three base "triplet" code. Promoters are often upstream ("5' to") the transcription initiation site of the corresponding gene. Other regulatory sequences of DNA in addition to promoters are known, including sequences involved with the binding of transcription factors, including response elements that are the DNA sequences bound by inducible factors. Enhancers comprise yet another group of regulatory sequences of DNA that can increase the utilization of promoters, and can function in either orientation (5'-3' or 3'-5') and in any location (upstream or downstream) relative to the promoter. Preferably, the regulatory sequence has a positive activity, i.e., binding of an endogenous ligand (e.g. a transcription factor) to the regulatory sequence increases transcription, thereby resulting in increased expression of the corresponding target gene. In such a case, interference with transcription by binding a polyamide to a regulatory sequence would reduce or abolish expression of a gene.

The promoter may also include or be adjacent to a regulatory sequence known in the art as a *silencer*. A silencer sequence generally has a negative regulatory effect on expression of the gene. In such a case, expression of a gene may be increased directly by using a polyamide to prevent binding of a factor to a silencer regulatory sequence or indirectly, by using a polyamide to block transcription of a factor to a silencer regulatory sequence.

It is to be understood that the polyamides of this invention bind to double stranded DNA in a sequence specific manner. The function of a segment of DNA of a given sequence, such as 5'-TATAAA-3', depends on its position relative to other functional regions in the DNA sequence. In this case, if the sequence 5'-TATAAA-3' on the coding strand of DNA is positioned about 30 base pairs upstream of the transcription start site, the sequence forms part of the promoter region (Lewin, *Genes VI*, pp. 831-835). On the other hand, if the sequence 5'-TATAAA-3' is downstream of the transcription start site in a coding region and in proper

-10-

register with the reading frame, the sequence encodes the tyrosyl and lysyl amino acid residues (Lewin, *Genes VI*, pp. 213-215).

5 While not being held to one hypothesis, it is believed that the binding of the polyamides of this invention modulate gene expression by altering the binding of DNA binding proteins, such as RNA polymerase, transcription factors, TBF, TFIIIB and other proteins. The effect on gene expression of polyamide binding to a segment of double stranded DNA is believed to be related to the function, e.g., promoter, of that segment of DNA.

10

It is to be understood by one skilled in the art that the improved polyamides of the present invention may bind to any of the above-described DNA sequences or any other sequence having a desired effect upon expression of a gene. In addition, U.S. Patent No. 5,578,444 describes numerous promoter targeting sequences from which base pair sequences for targeting 15 an improved polyamide of the present invention may be identified.

20 It is generally understood by those skilled in the art that the basic structure of DNA in a living cell includes both *major* and a *minor groove*. For the purposes of describing the present invention, the *minor groove* is the narrow groove of DNA as illustrated in common molecular biology references such as Lewin, B., *Genes VI*, Oxford University Press, New York (1997).

To affect gene expression in a cell, which may include causing an increase or a decrease 25 in gene expression, a effective quantity of one or more polyamide is contacted with the cell and internalized by the cell. The cell may be contacted *in vivo* or *in vitro*. Effective extracellular concentrations of polyamides that can modulate gene expression range from about 10 nanomolar to about 1 micromolar. Gottesfeld, J.M., *et al.*, *Nature* 387 202-205 (1997). To determine effective amounts and concentrations of polyamides *in vitro*, a suitable number of cells is plated 30 on tissue culture plates and various quantities of one or more polyamide are added to separate wells. Gene expression following exposure to a polyamide can be monitored in the cells or medium by detecting the amount of the protein gene product present as determined by various techniques utilizing specific antibodies, including ELISA and western blot. Alternatively, gene expression following exposure to a polyamide can be monitored by detecting the amount of messenger RNA present as determined by various techniques, including northern blot and RT-PCR.

Similarly, to determine effective amounts and concentrations of polyamides for *in vivo* administration, a sample of body tissue or fluid, such as plasma, blood, urine, cerebrospinal fluid, saliva, or biopsy of skin, muscle, liver, brain or other appropriate tissue source is analyzed.

5 Gene expression following exposure to a polyamide can be monitored by detecting the amount of the protein gene product present as determined by various techniques utilizing specific antibodies, including ELISA and western blot. Alternatively, gene expression following exposure to a polyamide can be monitored by the detecting the amount of messenger RNA present as determined by various techniques, including northern blot and RT-PCR.

10

The polyamides of this invention may be formulated into diagnostic and therapeutic compositions for *in vivo* or *in vitro* use. Representative methods of formulation may be found in *Remington: The Science and Practice of Pharmacy*, 19th ed., Mack Publishing Co., Easton, PA (1995).

15

For *in vivo* use, the polyamides may be incorporated into a physiologically acceptable pharmaceutical composition that is administered to a patient in need of treatment or an animal for medical or research purposes. The polyamide composition comprises pharmaceutically acceptable carriers, excipients, adjuvants, stabilizers, and vehicles. The composition may be in solid, liquid, gel, or aerosol form. The polyamide composition of the present invention may be administered in various dosage forms orally, parentally, by inhalation spray, rectally, or topically. The term parenteral as used herein includes, subcutaneous, intravenous, intramuscular, intrasternal, infusion techniques or intraperitoneally.

25

The selection of the precise concentration, composition, and delivery regimen is influenced by, *inter alia*, the specific pharmacological properties of the particular selected compound, the intended use, the nature and severity of the condition being treated or diagnosed, the age, weight, gender, physical condition and mental acuity of the intended recipient as well as the route of administration. Such considerations are within the purview of the skilled artisan. Thus, the dosage regimen may vary widely, but can be determined routinely using standard methods.

-12-

Polyamides of the present invention are also useful for detecting the presence of double stranded DNA of a specific sequence for diagnostic or preparative purposes. The sample containing the double stranded DNA can be contacted by polyamide linked to a solid substrate, thereby isolating DNA comprising a desired sequence. Alternatively, polyamides linked to a suitable detectable marker, such as biotin, a hapten, a radioisotope or a dye molecule, can be contacted by a sample containing double stranded DNA.

The design of bifunctional sequence specific DNA binding molecules requires the integration of two separate entities: recognition and functional activity. Polyamides that specifically bind with subnanomolar affinity to the minor groove of a predetermined sequence of double stranded DNA are linked to a functional molecule, providing the corresponding bifunctional conjugates useful in molecular biology, genomic sequencing, and human medicine. Polyamides of this invention can be conjugated to a variety of functional molecules, which can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotides, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)- α -tocopheral, psoralen, EDTA, methidium, acridine, Ni(II)-Gly-Gly-His, TO, Dansyl, pyrene, N-bromoacetamide, and gold particles. Such bifunctional polyamides are useful for DNA affinity capture, covalent DNA modification, oxidative DNA cleavage, and DNA photocleavage. Such bifunctional polyamides are useful for DNA detection by providing a polyamide linked to a detectable label. Detailed instructions for synthesis of such bifunctional polyamides can be found in copending U.S. provisional application 60/043,444, the teachings of which are incorporated by reference.

DNA complexed to a labeled polyamide can then be determined using the appropriate detection system as is well known to one skilled in the art. For example, DNA associated with a polyamide linked to biotin can be detected by a streptavidin / alkaline phosphatase system.

30

The present invention also describes a diagnostic system, preferably in kit form, for assaying for the presence of the double stranded DNA sequence bound by the polyamide of this invention in a body sample, such brain tissue, cell suspensions or tissue sections, or body fluid

samples such as CSF, blood, plasma or serum, where it is desirable to detect the presence, and preferably the amount, of the double stranded DNA sequence bound by the polyamide in the sample according to the diagnostic methods described herein.

5 The diagnostic system includes, in an amount sufficient to perform at least one assay, a specific polyamide as a separately packaged reagent. Instructions for use of the packaged reagent(s) are also typically included. As used herein, the term "package" refers to a solid matrix or material such as glass, plastic (e.g., polyethylene, polypropylene or polycarbonate), paper, foil and the like capable of holding within fixed limits a polyamide of the present invention. Thus, for example, a package can be a glass vial used to contain milligram quantities of a contemplated polyamide or it can be a microliter plate well to which microgram quantities of a contemplated polyamide have been operatively affixed, i.e., linked so as to be capable of being bound by the target DNA sequence. "Instructions for use" typically include a tangible expression describing the reagent concentration or at least one assay method parameter such as the relative amounts of reagent and sample to be admixed, maintenance time periods for reagent or sample admixtures, temperature, buffer conditions and the like. A diagnostic system of the present invention preferably also includes a detectable label and a detecting or indicating means capable of signaling the binding of the contemplated polyamide of the present invention to the target DNA sequence. As noted above, numerous detectable labels, such as biotin, and detecting or indicating means, such as enzyme-linked (direct or indirect) streptavidin, are well known in the art.

20 As used herein, "subnanomolar affinity" means binding that is characterized by a dissociation constant, K_d , of less than 1 nM, as measured by DNase I footprint titration. Preferably, polyamides of the present invention are characterized by subnanomolar binding affinity for the identified target DNA sequence. As used herein, the "selectivity" of the binding of a polyamide to a DNA sequence is the ratio of the dissociation constant, K_d , as measured by DNase I footprint titration of binding the polyamide to a mismatch DNA sequence divided by the corresponding dissociation constant of the binding of the polyamide to the identified target DNA sequence. Preferably, polyamides of the present invention are characterized by a selectivity of 5 or greater, more preferably a selectivity of greater than 10.

-14-

The exemplary polyamide that illustrates the compositions and methods of the present invention is polyamide 3 of Figure 1, ImImHpPy- γ -ImPyPyPy- β -Dp. This polyamide was designed according to the method of the present invention to target the identified sequence 5'-WGGTCW-3'. See Table 5, below, Sequence No. 36 and the corresponding sequence of carboxamide binding pairs. Polyamide 3 binds an identified target sequence 5'-TGGTCA-3' with a dissociation constant, as measured by DNase I footprint titration, of 0.48 nM, i.e., with subnanomolar affinity as defined herein (see Table 1, below). The polyamide binds to the mismatch sequence 5'-TGGACA-3' with a dissociation constant of 37 nM, yielding a selectivity, as defined herein, of 77 (Table 1).

10

Figure 1 shows representative structures of polyamides. ImImPyPy- γ -ImPyPyPy- β -Dp (1), ImImPyPy- γ -ImHpPyPy- β -Dp (2), and ImImHpPy- γ -ImPyPyPy- β -Dp (3). (Hp = 3-hydroxy-N-methylpyrrole, Im = N-methylimidazole, Py = N-methylpyrrole, β = β -alanine, γ = γ -aminobutyric acid, Dp = Dimethylaminopropylamide). Polyamides were synthesized by solid phase methods using Boc-protected 3-methoxypyrrole, imidazole, and pyrrole aromatic amino acids, cleaved from the support by aminolysis, deprotected with sodium thiophenoxide, and purified by reversed phase HPLC. Baird, E. E. & Dervan, P. B. describes the solid phase synthesis of polyamides containing imidazole and pyrrole amino acids. *J. Am. Chem. Soc.* 118, 6141-6146 (1996); also see PCT US 97/003332. The identity and purity of the polyamides were verified by 1 H NMR, analytical HPLC, and matrix-assisted laser-desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS-monoisotopic): 1 1223.6 (1223.6 calculated), 2 1239.6 (1239.6 calculated); 3 1239.6 (1239.6 calculated).

Figure 2 illustrates binding models for polyamides 1-3 in complex with 5'-TGGTCA-3' and 5'-TGGACA-3' (A•T and T•A in fourth position highlighted). Filled and unfilled circles represent imidazole and pyrrole rings respectively; circles containing an H represent 3-hydroxypyrrole, the curved line connecting the polyamide subunits represents γ -aminobutyric acid, the diamond represents β -alanine, and the + represents the positively charged dimethylaminopropylamide tail group.

30

Figure 3 shows quantitative DNase I footprint titration experiments with polyamides 2 and 3 on the 3' 32 P labeled 250-bp pJK6 EcoRI/PvuII restriction fragment. Lane 1, intact DNA; lanes 2-11 DNase I digestion products in the presence of 100, 50, 20, 10, 5, 2, 1, 0.5, 0.2, 0.1 nM

-15-

polyamide, respectively; lane 12, DNase I digestion products in the absence of polyamide; lane 13, adenine-specific chemical sequencing. Iverson, B. L. & Dervan, P. B. describes an adenine-specific DNA chemical sequencing reaction. *Methods Enzymol.* 15, 7823-7830 (1987). All reactions were done in a total volume of 400 μ L. A polyamide stock solution or H₂O was added 5 to an assay buffer containing radiolabeled restriction fragment, with the final solution conditions of 10 mM Tris-HCl, 10 mM KCl, 10 mM MgCl₂, 5 mM CaCl₂, pH 7.0. Solutions were allowed to equilibrate for 4-12 h at 22 °C before initiation of footprinting reactions. Footprinting reactions, separation of cleavage products, and data analysis were carried out as described. White, S., Baird, E. E. & Dervan, P. B. Effects of the A•T/T•A degeneracy of 10 pyrrole-imidazole polyamide recognition in the minor groove of DNA. *Biochemistry* 35, 12532-12537 (1996).

Figure 4 shows the structure and equilibrium dissociation constant for numerous compounds of the present invention. Polyamides are shown in complex with their respective 15 match site. Filled and unfilled circles represent imidazole (Im) and pyrrole (Py) rings, respectively; circles containing an H represent 3-hydroxypyrrole (Hp), the curved line connecting the polyamide subunits represents γ -aminobutyric acid (γ), the diamond represents β -alanine (β), and the + represents the positively charged dimethylaminopropylamide tail group (Dp). The equilibrium dissociation constants are the average values obtained from three DNase 20 I footprint titration experiments. The standard deviation for each set is less than 15% of the reported number. Assays were carried out in the presence of 10 mM Tris-HCl, 10 mM KCl, 10 mM MgCl₂, and 5 mM CaCl₂ at pH 7.0 and 22°C.

Four-ring polyamide subunits, covalently coupled to form eight-ring hairpin structures, 25 bind specifically to 6-bp target sequences at subnanomolar concentrations. Trauger, J.W., Baird, E. E. & Dervan, P.B. describe the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* 382, 559-561 (1996); Swalley, S. E., Baird, E. E. & Dervan, P. B. describe the discrimination of 5'-GGGG-3', 5'-GCGC-3', and 5'-GGCC'3' sequences in the minor groove of DNA by eight-ring hairpin polyamides. *J. Am. Chem. Soc.* 119, 6953-6961 30 (1997). The DNA-binding affinities of three eight-ring hairpin polyamides shown in Figure 1 as compound 1, 2, and 3 containing pairings of Im/Py, Py/Im opposite G•C, C•G and either Py/Py, Hp/Py, or Py/Hp at a common single point opposite T•A and A•T has been determined. Equilibrium dissociation constants (K_d) for ImImPyPy- γ -ImPyPyPy- β -Dp 1, ImImPyPy- γ -ImHpPyPy- β -Dp 2, ImImHpPy- γ -ImPyPyPy- β -Dp 3 of Figure 1 are shown in Table 1. 35 Brenowitz, M., Senear, D. F., Shea, M. A. & Ackers, G. K. describe a quantitative DNase footprint titration method for studying protein-DNA interactions. *Methods Enzymol.* 130, 132-

181 (1986); The K_d values were determined by quantitative DNase I footprint titration experiments: on a 3' 32 P-labeled 250-bp DNA fragment containing the target sites, 5'-TGGACA-3' and 5'-TGGTCA-3' which differ by a single A•T base pair in the fourth position. The DNase footprint gels are shown in Figure 3.

5

TABLE 1 Equilibrium dissociation constants*

Polyamide†	5'-TGGTCA-3'	5'-TGGACA-3'	$K_{\text{rel}}^{\ddagger}$
1 Py/Py	 5'-T G G T C A-3' 3'-A C C A G T-5' $K_d = 0.077 \text{ nM}$	 5'-T G G A C A-3' 3'-A C C T G T-5' $K_d = 0.15 \text{ nM}$	2.0
2 Py/Hp	 5'-T G G T C A-3' 3'-A C C A G T-5' $K_d = 15 \text{ nM}$	 5'-T G G A C A-3' 3'-A C C T G T-5' $K_d = 0.83 \text{ nM}$	0.06
3 Hp/Py	 5'-T G G T C A-3' 3'-A C C A G T-5' $K_d = 0.48 \text{ nM}$	 5'-T G G A C A-3' 3'-A C C T G T-5' $K_d = 37 \text{ nM}$	77

*The reported dissociation constants are the average values obtained from three DNase I footprint titration experiments. The standard deviation for each data set is less than 15% of the reported number. Assays were carried out in the presence of 10 mM Tris-HCl, 10 mM KCl, 10 mM MgCl₂, and 5 mM CaCl₂ at pH 7.0 and 22 °C.

†Ring pairing opposite T•A and A•T in the fourth position.

‡Calculated as $K_d(5'\text{-TGGACA-3'})/K_d(5'\text{-TGCTCA-3'})$.

Based on the pairing rules for polyamide-DNA complexes both of these sequences are a match for control polyamide 1 which places a Py/Py pairing opposite A•T and T•A at both sites. It was determined that polyamide 1 (Py/Py) binds to 5'-TGGTCA-3' and 5'-TGGACA-3' within a factor of 2 ($K_d = 0.077$ or 0.15 nM respectively). In contrast, polyamide 2 (Py/Hp) binds to 5'-TGGTCA-3' and 5'-TGGACA-3' with dissociation constants which differ by a factor of 18 ($K_d = 15$ nM and 0.83 nM respectively). By reversing the pairing in polyamide 3 (Hp/Py) the dissociation constants differ again in the opposite direction by a factor of 77 ($K_d = 0.48$ nM and 37 nM respectively). Control experiments performed on separate DNA fragments; reveal that neither a 5'-TGGGCA-3' or a 5'-TGGCCA-3' site is bound by polyamide 2 or 3 at concentrations ≤ 100 nM, indicating that the Hp/Py and Py/Hp ring pairings do not bind opposite G•C or C•G.

20

The specificity of polyamides 2 and 3 for sites which differ by a single A•T/T•A base pair results from small chemical changes. Replacing the Py/Py pair in 1 with a Py/Hp pairing as in 2, a single substitution of C3-OH for C3-H, destabilizes interaction with 5'-TGGTCA-3' by 191-fold, a free energy difference of 3.1 kcal mol⁻¹. Interaction of 2 with 5'-TGGACA-3' is destabilized only 6-fold relative to 1, a free energy difference of 1.1 kcal mol⁻¹. Similarly,

-17-

replacing the Py/Py pair in 1 with Hp/Py as in 3 destabilizes interaction with 5'-TGGACA-3' by 252-fold, a free energy difference of 3.2 kcal mol⁻¹. Interaction of 3 with 5'TGGTCA-3' is destabilized only 6-fold relative to 1, a free energy difference of 1.0 kcal mol⁻¹.

The polyamides of this invention provide for coded targeting of predetermined DNA sequences with affinity and specificity comparable to sequence-specific DNA binding proteins. Hp, Im, and Py polyamides complete the minor groove recognition code using three aromatic amino acids which combine to form four ring pairings (Im/Py, Py/Im, Hp/Py, and Py/Hp) which complement the four Watson-Crick base pairs, as shown in TABLE 2. There are a possible 240 four base pair sequences which contain at least 1 A•T or T•A base pair and therefore can advantageously use an Hp/Py, or Py/Hp carboxamide binding. Polyamides binding to any of these sequences can be designed in accordance with the code of TABLE 2.

TABLE 2 Pairing code for minor groove recognition*

Pair	G•C	C•G	T•A	A•T
Im/Py	+	-	-	-
Py/Im	-	+	-	-
Hp/Py	-	-	+	-
Py/Hp	-	-	-	+

* favored (+), disfavored (-)

For certain G•C rich sequences the affinity of polyamide-DNA complexes may be enhanced by substitution of an Im/β pair for Im/Py at G•C and β/Im for Py/Im at C•G. At A•T and T•A base pairs, either a Py/β, β/Py, Hp/β, β/Hp, and β/β may be used. The alternate aliphatic/aromatic amino acid pairing code is described in Table 3.

TABLE 3 Aliphatic/Aromatic substitution for ring pairings*

Pair	Substitution
Im/Py	Im/β
Py/Im	β/Im
Hp/Py	Py/β, β/Py, Hp/β, β/Hp
Py/Hp	Py/β, β/Py, β/Hp, β/β

U. S. Patent 5,578,444 describes numerous promoter region targeting sequences from which base pair sequences for targeting a polyamide can be identified.

PCT U.S. 97/003332 describes methods for synthesis of polyamides which are suitable for preparing polyamides of this invention. The use of β -alanine in place of a pyrrole amino acid in the synthetic methods provides aromatic/aliphatic pairing (Im/ β , β /Im, Hp/ β , β /Hp, Py/ β , and β /Py) and aliphatic/aliphatic pairing (β / β) substitution. The use of γ -aminobutyric acid, or a substituted γ -aminobutyric acid such as (R)-2,4 diaminobutyric acid, provides for preferred hairpin turns. The following examples illustrate the synthesis of polyamides of the present invention.

The process of designing a preferred polyamide molecule $X_1X_2X_3X_4-\gamma-X_5X_6X_7X_8$ comprising eight aromatic amino acid residues of this invention is shown schematically in Figure 5. The polyamide design process provides a method for designing an eight carboxamide residue molecule comprising four carboxamide binding pairs for detection and binding of a target six base pair 5'-WNNNNW-3' sequence in the minor groove of double stranded DNA. The design process identifies an appropriate polyamide ligand for recognition of a predetermined 6-bp, 5'-WNNNNW-3' sequence with subnanomolar affinity and >10-fold specificity versus mismatch sites. Trauger, J.W., Baird, E. E. Dervan, P.B. describes the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* 382, 559-561 (1996).

In order to prepare a polyamide molecule specific for an identified six base pair sequence of double stranded DNA, a user starts the 8-ring polyamide design process that implements the minor groove recognition pairing code summarized in Table 2 above. In the design process a 5'-WNNNNW-3' sequence was identified. In a preferred embodiment, the identified sequence was located within a gene promoter. U. S. Patent 5,578,444 describes numerous promoter region targeting sequences from which target six base pair sequences for targeting a polyamide can be identified. The identified sequence was then defined as 5'-W_abcdW-3' in a stepwise process wherein *a*, *b*, *c*, and *d*, were sequentially and independently defined as A, G, C, or T. The structure of the polyamide molecule was then correspondingly defined by sequentially choosing antiparallel carboxamide binding pairs according to the minor groove pairing code summarized in Table 2 above. Thus, if *a* was G, then X₁ was defined as Im, and X₈ was defined as Py. If *a* was C, then X₁ was defined as Py, and X₈ was defined as Im. If *a* was T, then X₁ was defined

as Hp, and X₈ was defined as Py. If **a** was A, then X₁ was defined as Py, and X₈ was defined as Hp.

Similarly, **b** was defined as A, G, C, or T and corresponding carboxamide binding pairs were defined. According to the same rules, if **b** was G, then X₂ was defined as Im, and X₇ was defined as Py. If **b** was C, then X₂ was defined as Py, and X₇ was defined as Im. Likewise, if **b** was T, then X₂ was defined as Hp, and X₇ was defined as Py. If **b** was A, then X₂ was defined as Py, and X₇ was defined as Hp.

The next step was to define **c** as A, G, C, or T and then define corresponding carboxamide binding pairs. Following the same rules, if **c** was G, then X₃ was defined as Im, and X₆ was defined as Py. If **c** was C, then X₃ was defined as Py, and X₆ was defined as Im. Similarly, if **c** was T, then X₃ was defined as Hp, and X₆ was defined as Py. If **c** was A, then X₃ was defined as Py, and X₆ was defined as Hp. Lastly, **d** was defined as A, G, C, or T and the last corresponding carboxamide binding pair was defined. According to above rules, if **d** was G, then X₄ was defined as Im, and X₅ was defined as Py. If **d** was C, then X₄ was defined as Py, and X₅ was defined as Im. If **d** was T, then X₄ was defined as Hp, and X₅ was defined as Py. If **d** was A, then X₄ was defined as Py, and X₅ was defined as Hp.

With all eight carboxamide residues that participate in binding pairs now defined, the designed polyamide X₁X₂X₃X₄-γ-X₅X₆X₇X₈ suitable for binding to the identified sequence was synthesized using known techniques. Baird, E. E. & Dervan, P. B. describes the solid phase synthesis of polyamides containing imidazole and pyrrole amino acids. *J. Am. Chem. Soc.* 118, 6141-6146 (1996); also see PCT US 97/003332.

The binding affinity of the synthesized polyamide to the identified sequence was determined using a quantitative DNase footprint titration method for studying protein-DNA interactions described by Brenowitz, M., Senear, D. F., Shea, M. A. & Ackers, G. K., *Methods Enzymol.* 130, 132-181 (1986). If the affinity of the synthesized polyamide at the target site was not subnanomolar affinity then adding a β-alanine (process A) was considered in order to optimize the exact positions of the binding pairs of aromatic amino acids. If the affinity of the said polyamide at said target site was subnanomolar affinity then the sequence specificity of the polyamide versus mismatch sequences was determined. If the specificity versus mismatch sites

-20-

was not > 10-fold specificity then adding a β -alanine (process A schematically shown in Figure 6) was considered, in order to optimize the positions of the aromatic amino acids in relationship to the base pairs in the minor groove. Specificity of the polyamide molecule for the target identified sequence versus mismatch sequence sites of greater than 10-fold was considered a successful result of design process.

The 256 polyamide molecules comprising four carboxamide binding pairs that were designed using this method are useful for binding to the 256 target 5'-NNNN-3' core sequences, and are listed in Tables 4-11. A corresponding polyamide molecule was designed for each DNA sequence (1-240) and (G1-G16) using the process outlined above and shown schematically in Figure 5.

If the synthesized polyamide molecule did not bind to the target identified sequence with subnanomolar affinity or if the synthesized polyamide molecule did not exhibit a specificity for the target identified sequence versus mismatch sequence sites of greater than 10-fold, the option of substituting an aliphatic amino acid residues for one of the carboxamide residues was considered. The preferred aliphatic amino acid residue is β -alanine. At least one aliphatic amino acid residue such as a β -alanine residue provided some flexibility to the central portion of the polyamide molecule, acting as a "spring" to permit optimization of the hydrogen bonding between the carboxamide binding pairs and the nucleotide bases of the double stranded DNA.

In general, it was not found to be advantageous to replace either member of the terminal carboxamide binding pair, X₁/X₈, with β -alanine. Similarly, β -alanine was not substituted for members of the binding pair, X₄/X₅, adjacent to the γ hairpin residue. β -alanine residues were not substituted for N-methylimidazole residues. The use of β -alanine in place of a pyrrole or 3-hydroxypyrrrole amino acid residue provides aromatic/aliphatic pairing (Im/ β , β /Im, Hp/ β , β /Hp, Py/ β , and β /Py) and aliphatic/aliphatic pairing (β / β) substitution.

The method for selecting which pyrrole amino acid to substitute with β -alanine is schematically illustrated in Figure 6. Selective placement of an aliphatic β -alanine (β) residue paired with either a pyrrole (Py), 3-hydroxypyrrrole (Hp), or imidazole (Im) aromatic amino acid or another β -alanine residue is found to compensate for sequence composition effects to improve

-21-

recognition and binding of the minor groove of DNA by pyrrole-imidazole polyamides of the present invention. If an all-ring polyamide has been found to have an affinity which is not subnanomolar, or a specificity versus mismatch sequences which is less than 10-fold it may be caused by DNA sequence-composition effects which can be reduced by replacement of an 5 aromatic amino acid with an aliphatic β -alanine residue. In a polyamide molecule that comprises four binding pairs it is only beneficial to place β -alanine in positions X₂, X₃, X₆, and X₇. No more than two β -alanine residues may be placed within a single hairpin structure. No more than a single β -residue may be placed within each individual polyamide subunit, e.g., if X₂ is replaced with β -alanine, then X₃ cannot be replaced.

10

These rules and others were implemented in the method schematically illustrated in Figure 6. This process is suitable for the refinement of the design polyamide comprising four binding pairs that has been designed by the method illustrated in Figure 5, but which lacks subnanomolar affinity or greater than 10-fold specificity at the identified target DNA sequence. 15 As in the basic design method, the designed polyamides are synthesized and the affinity and specificity of binding to the target DNA were determined.

For a given polyamide molecule X₁X₂X₃X₄- γ -X₅X₆X₇X₈ there are five possible outcomes for the process of substituting a β -alanine residue for an aromatic amino acid residue. 20 First, there may be no position at which it is possible to add a β -alanine residue; in such case, a better binding affinity or selectivity can be sought in the design and synthesis of a polyamide with five or six carboxamide binding pairs, described below. Second, the process may result in a derivative which contains a single β -alanine substitution (such derivatives are numbered according to the parent numbering scheme such that a single β -derivative of compound 5 would 25 be called 5 β), which is sufficient to produce subnanomolar binding affinity and >10-fold specificity, and at which point the process is deemed complete.

Third, the process of Figure 5 may result in a polyamide which contains a single β -alanine substitution which is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there are no additional positions in which it is possible to substitute a β -alanine residue, and in such a case a polyamide with five or six carboxamide binding pairs, should be designed and synthesized, as described below. Fourth, the process of Figure 5 may

-22-

result in a polyamide that contains a single β -alanine substitution that is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there is an additional position for β -alanine substitution that does produce a polyamide with the criterion level of affinity and selectivity and therefore the design process is deemed complete. Polyamides that were designed
5 by the process that produces polyamide molecules that contain two β -alanine residues are labeled β 2 in Tables 12-19.

A fifth possibility is that substitution at a second position by the method illustrated in Figure 6 with a second β -alanine residue is not sufficient to produce a polyamide having the
10 subnanomolar binding affinity and >10-fold specificity, and a polyamide with five or six carboxamide binding pairs, should be designed and synthesized, as described below. Tables 12-19 list polyamides corresponding to sequences 1-240 and G1-G16 which contain either one or two β -alanine residues.

TABLE 4: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGWNW-3'

	DNA sequence	aromatic amino acid sequence
	1) 5'-W G T T T W-3'	ImHpHpHp-γ-PyPyPyPy
5	2) 5'-W G T T A W-3'	ImHpHpPy-γ-HpPyPyPy
	3) 5'-W G T T G W-3'	ImHpHpIm-γ-PyPyPyPy
	4) 5'-W G T T C W-3'	ImHpHpPy-γ-ImPyPyPy
	5) 5'-W G T A T W-3'	ImHpPyHp-γ-PyHpPyPy
	6) 5'-W G T A A W-3'	ImHpPyPy-γ-HpHpPyPy
10	7) 5'-W G T A G W-3'	ImHpPyIm-γ-PyHpPyPy
	8) 5'-W G T A C W-3'	ImHpPyPy-γ-ImHpPyPy
	9) 5'-W G T G T W-3'	ImHpImHp-γ-PyPyPyPy
	10) 5'-W G T G A W-3'	ImHpImPy-γ-HpPyPyPy
	11) 5'-W G T G G W-3'	ImHpImIm-γ-PyPyPyPy
15	12) 5'-W G T G C W-3'	ImHpImPy-γ-ImPyPyPy
	13) 5'-W G T C T W-3'	ImHpPyHp-γ-PyImPyPy
	14) 5'-W G T C A W-3'	ImHpPyPy-γ-HpImPyPy
	15) 5'-W G T C G W-3'	ImHpPyIm-γ-PyImPyPy
	16) 5'-W G T C C W-3'	ImHpPyPy-γ-ImImPyPy
20	17) 5'-W G A T T W-3'	ImPyHpHp-γ-PyPyHpPy
	18) 5'-W G A T A W-3'	ImPyHpPy-γ-HpPyHpPy
	19) 5'-W G A T G W-3'	ImPyHpIm-γ-PyPyHpPy
	20) 5'-W G A T C W-3'	ImPyHpPy-γ-ImPyHpPy
	21) 5'-W G A A T W-3'	ImPyPyHp-γ-PyHpHpPy
25	22) 5'-W G A A A W-3'	ImPyPyPy-γ-HpHpHpPy
	23) 5'-W G A A G W-3'	ImPyPyIm-γ-PyHpHpPy
	24) 5'-W G A A C W-3'	ImPyPyPy-γ-ImHpHpPy
	25) 5'-W G A G T W-3'	ImPyImHp-γ-PyPyHpPy
	26) 5'-W G A G A W-3'	ImPyImPy-γ-HpPyHpPy
30	27) 5'-W G A G G W-3'	ImPyImIm-γ-PyPyHpPy
	28) 5'-W G A G C W-3'	ImPyImPy-γ-ImPyHpPy
	29) 5'-W G A C T W-3'	ImPyPyHp-γ-PyImHpPy
	30) 5'-W G A C A W-3'	ImPyPyPy-γ-HpImHpPy
	31) 5'-W G A C G W-3'	ImPyPyIm-γ-PyImHpPy
35	32) 5'-W G A C C W-3'	ImPyPyPy-γ-ImImHpPy

TABLE 5: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGSNNW-3'

	DNA sequence	aromatic amino acid sequence
	33) 5'-W G G T T W-3'	ImImHpHp-γ-PyPyPyPy
5	34) 5'-W G G T A W-3'	ImImHpPy-γ-HpPyPyPy
	35) 5'-W G G T G W-3'	ImImHpIm-γ-PyPyPyPy
	36) 5'-W G G T C W-3'	ImImHpPy-γ-ImPyPyPy
	37) 5'-W G G A T W-3'	ImImPyHp-γ-PyHpPyPy
	38) 5'-W G G A A W-3'	ImImPyPy-γ-HpHpPyPy
10	39) 5'-W G G A G W-3'	ImImPyIm-γ-PyHpPyPy
	40) 5'-W G G A C W-3'	ImImPyPy-γ-ImHpPyPy
	41) 5'-W G G G T W-3'	ImImImHp-γ-PyPyPyPy
	42) 5'-W G G G A W-3'	ImImImPy-γ-HpPyPyPy
	43) 5'-W G G C T W-3'	ImImPyHp-γ-PyImPyPy
15	44) 5'-W G G C A W-3'	ImImPyPy-γ-HpImPyPy
	45) 5'-W G C T T W-3'	ImPyHpHp-γ-PyPyImPy
	46) 5'-W G C T A W-3'	ImPyHpPy-γ-HpPyImPy
	47) 5'-W G C T G W-3'	ImPyHpIm-γ-PyPyImPy
	48) 5'-W G C T C W-3'	ImPyHpPy-γ-ImPyImPy
20	49) 5'-W G C A T W-3'	ImPyPyHp-γ-PyHpImPy
	50) 5'-W G C A A W-3'	ImPyPyPy-γ-HpHpImPy
	51) 5'-W G C A G W-3'	ImPyPyIm-γ-PyHpImPy
	52) 5'-W G C A C W-3'	ImPyPyPy-γ-ImHpImPy
	53) 5'-W G C G T W-3'	ImPyImHp-γ-PyPyImPy
25	54) 5'-W G C G A W-3'	ImPyImPy-γ-HpPyImPy
	55) 5'-W G C C T W-3'	ImPyPyHp-γ-PyImImPy
	56) 5'-W G C C A W-3'	ImPyPyPy-γ-HpImImPy
	G1) 5'-W G G G G W-3'	ImImImIm-γ-PyPyPyPy
	G2) 5'-W G G G C W-3'	ImImImPy-γ-ImPyPyPy
30	G3) 5'-W G G C G W-3'	ImImPyIm-γ-PyImPyPy
	G4) 5'-W G G C C W-3'	ImImPyPy-γ-ImImPyPy
	G5) 5'-W G C G G W-3'	ImPyImIm-γ-PyPyImPy
	G6) 5'-W G C G C W-3'	ImPyImPy-γ-ImPyImPy
	G7) 5'-W G C C G W-3'	ImPyPyIm-γ-PyImImPy
35	G8) 5'-W G C C C W-3'	ImPyPyPy-γ-ImImImPy

TABLE 6: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	5'-W T T T T W-3'	HpHpHpHp-γ-PyPyPyPy
	58) 5'-W T T T A W-3'	HpHpHpPy-γ-HpPyPyPy
	59) 5'-W T T T G W-3'	HpHpHpIm-γ-PyPyPyPy
	60) 5'-W T T T C W-3'	HpHpHpPy-γ-ImPyPyPy
	61) 5'-W T T A T W-3'	HpHpPyHp-γ-PyHpPyPy
	62) 5'-W T T A A W-3'	HpHpPyPy-γ-HpHpPyPy
10	63) 5'-W T T A G W-3'	HpHpPyIm-γ-PyHpPyPy
	64) 5'-W T T A C W-3'	HpHpPyPy-γ-ImHpPyPy
	65) 5'-W T T G T W-3'	HpHpImHp-γ-PyPyPyPy
	66) 5'-W T T G A W-3'	HpHpImPy-γ-HpPyPyPy
	67) 5'-W T T G G W-3'	HpHpImIm-γ-PyPyPyPy
15	68) 5'-W T T G C W-3'	HpHpImPy-γ-ImPyPyPy
	69) 5'-W T T C T W-3'	HpHpPyHp-γ-PyImPyPy
	70) 5'-W T T C A W-3'	HpHpPyPy-γ-HpImPyPy
	71) 5'-W T T C G W-3'	HpHpPyIm-γ-PyImPyPy
	72) 5'-W T T C C W-3'	HpHpPyPy-γ-ImImPyPy
20	73) 5'-W T A T T W-3'	HpPyHpHp-γ-PyPyHpPy
	74) 5'-W T A T A W-3'	HpPyHpPy-γ-HpPyHpPy
	75) 5'-W T A T G W-3'	HpPyHpIm-γ-PyPyHpPy
	76) 5'-W T A T C W-3'	HpPyHpPy-γ-ImPyHpPy
	77) 5'-W T A A T W-3'	HpPyPyHp-γ-PyHpHpPy
25	78) 5'-W T A A A W-3'	HpPyPyPy-γ-HpHpHpPy
	79) 5'-W T A A G W-3'	HpPyPyIm-γ-PyHpHpPy
	80) 5'-W T A A C W-3'	HpPyPyPy-γ-ImHpHpPy
	81) 5'-W T A G T W-3'	HpPyImHp-γ-PyPyHpPy
	82) 5'-W T A G A W-3'	HpPyImPy-γ-HpPyHpPy
30	83) 5'-W T A G G W-3'	HpPyImIm-γ-PyPyHpPy
	84) 5'-W T A G C W-3'	HpPyImPy-γ-ImPyHpPy
	85) 5'-W T A C T W-3'	HpPyPyHp-γ-PyImHpPy
	86) 5'-W T A C A W-3'	HpPyPyPy-γ-HpImHpPy
	87) 5'-W T A C G W-3'	HpPyPyIm-γ-PyImHpPy
35	88) 5'-W T A C C W-3'	HpPyPyPy-γ-ImImHpPy

TABLE 7: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTSNNW-3'

	DNA sequence	aromatic amino acid sequence
	89) 5'-W T G T T W-3'	HpImHpHp-γ-PyPyPyPy
5	90) 5'-W T G T A W-3'	HpImHpPy-γ-HpPyPyPy
	91) 5'-W T G T G W-3'	HpImHpIm-γ-PyPyPyPy
	92) 5'-W T G T C W-3'	HpImHpPy-γ-ImPyPyPy
	93) 5'-W T G A T W-3'	HpImPyHp-γ-PyHpPyPy
	94) 5'-W T G A A W-3'	HpImPyPy-γ-HpHpPyPy
10	95) 5'-W T G A G W-3'	HpImPyIm-γ-PyHpPyPy
	96) 5'-W T G A C W-3'	HpImPyPy-γ-ImHpPyPy
	97) 5'-W T G G T W-3'	HpImImHp-γ-PyPyPyPy
	98) 5'-W T G G A W-3'	HpImImPy-γ-HpPyPyPy
	99) 5'-W T G C T W-3'	HpImPyHp-γ-PyImPyPy
15	100) 5'-W T G C A W-3'	HpImPyPy-γ-HpImPyPy
	101) 5'-W T G G G W-3'	HpImImIm-γ-PyPyPyPy
	102) 5'-W T G G C W-3'	HpImImPy-γ-ImPyPyPy
	103) 5'-W T G C G W-3'	HpImPyIm-γ-PyImPyPy
	104) 5'-W T G C C W-3'	HpImPyPy-γ-ImImPyPy
20	105) 5'-W T C T T W-3'	HpPyHpHp-γ-PyPyImPy
	106) 5'-W T C T A W-3'	HpPyHpPy-γ-HpPyImPy
	107) 5'-W T C T G W-3'	HpPyHpIm-γ-PyPyImPy
	108) 5'-W T C T C W-3'	HpPyHpPy-γ-ImPyImPy
	109) 5'-W T C A T W-3'	HpPyPyHp-γ-PyHpImPy
25	110) 5'-W T C A A W-3'	HpPyPyPy-γ-HpHpImPy
	111) 5'-W T C A G W-3'	HpPyPyIm-γ-PyHpImPy
	112) 5'-W T C A C W-3'	HpPyPyPy-γ-ImHpImPy
	113) 5'-W T C G T W-3'	HpPyImHp-γ-PyPyImPy
	114) 5'-W T C G A W-3'	HpPyImPy-γ-HpPyImPy
30	115) 5'-W T C C T W-3'	HpPyPyHp-γ-PyImImPy
	116) 5'-W T C C A W-3'	HpPyPyPy-γ-HpImImPy
	117) 5'-W T C G G W-3'	HpPyImIm-γ-PyPyImPy
	118) 5'-W T C G C W-3'	HpPyImPy-γ-ImPyImPy
	119) 5'-W T C C G W-3'	HpPyPyIm-γ-PyImImPy
35	120) 5'-W T C C C W-3'	HpPyPyPy-γ-ImImImPy

TABLE 8: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WAWNNW-3'

	DNA sequence	aromatic amino acid sequence
	121) 5'-W A T T T W-3'	PyH _p H _p H _p -γ-PyPyPyH _p
5	122) 5'-W A T T A W-3'	PyH _p H _p Py-γ-H _p PyPyH _p
	123) 5'-W A T T G W-3'	PyH _p H _p I _m -γ-PyPyPyH _p
	124) 5'-W A T T C W-3'	PyH _p H _p Py-γ-I _m PyPyH _p
	125) 5'-W A T A T W-3'	PyH _p PyH _p -γ-PyH _p PyH _p
	126) 5'-W A T A A W-3'	PyH _p PyPy-γ-H _p H _p PyH _p
10	127) 5'-W A T A G W-3'	PyH _p PyI _m -γ-PyH _p PyH _p
	128) 5'-W A T A C W-3'	PyH _p PyPy-γ-I _m H _p PyH _p
	129) 5'-W A T G T W-3'	PyH _p I _m H _p -γ-PyPyPyH _p
	130) 5'-W A T G A W-3'	PyH _p I _m Py-γ-H _p PyPyH _p
	131) 5'-W A T G G W-3'	PyH _p I _m I _m -γ-PyPyPyH _p
15	132) 5'-W A T G C W-3'	PyH _p I _m Py-γ-I _m PyPyH _p
	133) 5'-W A T C T W-3'	PyH _p PyH _p -γ-PyI _m PyH _p
	134) 5'-W A T C A W-3'	PyH _p PyPy-γ-H _p I _m PyH _p
	135) 5'-W A T C G W-3'	PyH _p PyI _m -γ-PyI _m PyH _p
	136) 5'-W A T C C W-3'	PyH _p PyPy-γ-I _m I _m PyH _p
20	137) 5'-W A A T T W-3'	PyPyH _p H _p -γ-PyPyH _p H _p
	138) 5'-W A A T A W-3'	PyPyH _p Py-γ-H _p PyH _p H _p
	139) 5'-W A A T G W-3'	PyPyH _p I _m -γ-PyPyH _p H _p
	140) 5'-W A A T C W-3'	PyPyH _p Py-γ-I _m PyH _p H _p
	141) 5'-W A A A T W-3'	PyPyH _p Py-γ-PyH _p H _p H _p
25	142) 5'-W A A A A W-3'	PyPyPyPy-γ-H _p H _p H _p H _p
	143) 5'-W A A A G W-3'	PyPyPyI _m -γ-PyH _p H _p H _p
	144) 5'-W A A A C W-3'	PyPyPyPy-γ-I _m H _p H _p H _p
	145) 5'-W A A G T W-3'	PyPyI _m H _p -γ-PyPyH _p H _p
	146) 5'-W A A G A W-3'	PyPyI _m Py-γ-H _p PyH _p H _p
30	147) 5'-W A A G G W-3'	PyPyI _m I _m -γ-PyPyH _p H _p
	148) 5'-W A A G C W-3'	PyPyI _m Py-γ-I _m PyH _p H _p
	149) 5'-W A A C T W-3'	PyPyPyH _p -γ-PyI _m H _p H _p
	150) 5'-W A A C A W-3'	PyPyPyPy-γ-H _p I _m H _p H _p
	151) 5'-W A A C G W-3'	PyPyPyI _m -γ-PyI _m H _p H _p
35	152) 5'-W A A C C W-3'	PyPyPyPy-γ-I _m I _m H _p H _p

TABLE 9: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WASNWW-3'

	DNA sequence	aromatic amino acid sequence
5	153) 5'-W A G T T W-3'	PyImHpHp-γ-PyPyPyHp
	154) 5'-W A G T A W-3'	PyImHpPy-γ-HpPyPyHp
	155) 5'-W A G T G W-3'	PyImHpIm-γ-PyPyPyHp
	156) 5'-W A G T C W-3'	PyImHpPy-γ-ImPyPyHp
	157) 5'-W A G A T W-3'	PyImPyHp-γ-PyHpPyHp
10	158) 5'-W A G A A W-3'	PyImPyPy-γ-HpHpPyHp
	159) 5'-W A G A G W-3'	PyImPyIm-γ-PyHpPyHp
	160) 5'-W A G A C W-3'	PyImPyPy-γ-ImHpPyHp
	161) 5'-W A G G T W-3'	PyImImHp-γ-PyPyPyHp
	162) 5'-W A G G A W-3'	PyImImPy-γ-HpPyPyHp
15	163) 5'-W A G C T W-3'	PyImPyHp-γ-PyImPyHp
	164) 5'-W A G C A W-3'	PyImPyPy-γ-HpImPyHp
	165) 5'-W A G G G W-3'	PyImImIm-γ-PyPyPyHp
	166) 5'-W A G G C W-3'	PyImImPy-γ-ImPyPyHp
	167) 5'-W A G C G W-3'	PyImPyIm-γ-PyImPyHp
	168) 5'-W A G C C W-3'	PyImPyPy-γ-ImImPyHp
20	169) 5'-W A C T T W-3'	PyPyHpHp-γ-PyPyImHp
	170) 5'-W A C T A W-3'	PyPyHpPy-γ-HpPyImHp
	171) 5'-W A C T G W-3'	PyPyHpIm-γ-PyPyImHp
	172) 5'-W A C T C W-3'	PyPyHpPy-γ-ImPyImHp
	173) 5'-W A C A T W-3'	PyPyPyHp-γ-PyHpImHp
25	174) 5'-W A C A A W-3'	PyPyPyPy-γ-HpHpImHp
	175) 5'-W A C A G W-3'	PyPyPyIm-γ-PyHpImHp
	176) 5'-W A C A C W-3'	PyPyPyPy-γ-ImHpImHp
	177) 5'-W A C G T W-3'	PyPyImHp-γ-PyPyImHp
	178) 5'-W A C G A W-3'	PyPyImPy-γ-HpPyImHp
30	179) 5'-W A C C T W-3'	PyPyPyHp-γ-PyImImHp
	180) 5'-W A C C A W-3'	PyPyPyPy-γ-HpImImHp
	181) 5'-W A C G G W-3'	PyPyImIm-γ-PyPyImHp
	182) 5'-W A C G C W-3'	PyPyImPy-γ-ImPyImHp
	183) 5'-W A C C G W-3'	PyPyPyIm-γ-PyImImHp
35	184) 5'-W A C C C W-3'	PyPyPyPy-γ-ImImImHp

TABLE 10: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCWNNW-3'

	DNA sequence	aromatic amino acid sequence
	185) 5'-W C T T T W-3'	PyH _p H _p H _p -γ-PyPyPyIm
5	186) 5'-W C T T A W-3'	PyH _p H _p Py-γ-H _p PyPyIm
	187) 5'-W C T T G W-3'	PyH _p H _p Im-γ-PyPyPyIm
	188) 5'-W C T T C W-3'	PyH _p H _p Py-γ-ImPyPyIm
	189) 5'-W C T A T W-3'	PyH _p PyH _p -γ-PyH _p PyIm
10	190) 5'-W C T A A W-3'	PyH _p PyPy-γ-H _p H _p PyIm
	191) 5'-W C T A G W-3'	PyH _p PyIm-γ-PyH _p PyIm
	192) 5'-W C T A C W-3'	PyH _p PyPy-γ-ImH _p PyIm
	193) 5'-W C T G T W-3'	PyH _p ImH _p -γ-PyPyPyIm
	194) 5'-W C T G A W-3'	PyH _p ImPy-γ-H _p PyPyIm
15	195) 5'-W C T G G W-3'	PyH _p ImIm-γ-PyPyPyIm
	196) 5'-W C T G C W-3'	PyH _p ImPy-γ-ImPyPyIm
	197) 5'-W C T C T W-3'	PyH _p PyH _p -γ-PyImPyIm
	198) 5'-W C T C A W-3'	PyH _p PyPy-γ-H _p ImPyIm
	199) 5'-W C T C G W-3'	PyH _p PyIm-γ-PyImPyIm
20	200) 5'-W C T C C W-3'	PyH _p PyPy-γ-ImImPyIm
	201) 5'-W C A T T W-3'	PyPyH _p H _p -γ-PyPyH _p Im
	202) 5'-W C A T A W-3'	PyPyH _p Py-γ-H _p PyH _p Im
	203) 5'-W C A T G W-3'	PyPyH _p Im-γ-PyPyH _p Im
	204) 5'-W C A T C W-3'	PyPyH _p Py-γ-ImPyH _p Im
	205) 5'-W C A A T W-3'	PyPyH _p Py-γ-PyH _p H _p Im
25	206) 5'-W C A A A W-3'	PyPyPyPy-γ-H _p H _p H _p Im
	207) 5'-W C A A G W-3'	PyPyPyIm-γ-PyH _p H _p Im
	208) 5'-W C A A C W-3'	PyPyPyPy-γ-ImH _p H _p Im
	209) 5'-W C A G T W-3'	PyPyImH _p -γ-PyPyH _p Im
	210) 5'-W C A G A W-3'	PyPyImPy-γ-H _p PyH _p Im
30	211) 5'-W C A G G W-3'	PyPyImIm-γ-PyPyH _p Im
	212) 5'-W C A G C W-3'	PyPyImPy-γ-ImPyH _p Im
	213) 5'-W C A C T W-3'	PyPyPyH _p -γ-PyImH _p Im
	214) 5'-W C A C A W-3'	PyPyPyPy-γ-H _p ImH _p Im
	215) 5'-W C A C G W-3'	PyPyPyIm-γ-PyImH _p Im
35	216) 5'-W C A C C W-3'	PyPyPyPy-γ-ImImH _p Im

TABLE 11: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	217) 5'-W C G T T W-3'	PyImHpHp-γ-PyPyPyIm
	218) 5'-W C G T A W-3'	PyImHpPy-γ-HpPyPyIm
	219) 5'-W C G T G W-3'	PyImHpIm-γ-PyPyPyIm
	220) 5'-W C G T C W-3'	PyImHpPy-γ-ImPyPyIm
	221) 5'-W C G A T W-3'	PyImPyHp-γ-PyHpPyIm
10	222) 5'-W C G A A W-3'	PyImPyPy-γ-HpHpPyIm
	223) 5'-W C G A G W-3'	PyImPyIm-γ-PyHpPyIm
	224) 5'-W C G A C W-3'	PyImPyPy-γ-ImHpPyIm
	225) 5'-W C G G T W-3'	PyImImHp-γ-PyPyPyIm
	226) 5'-W C G G A W-3'	PyImImPy-γ-HpPyPyIm
15	227) 5'-W C G C T W-3'	PyImPyHp-γ-PyImPyIm
	228) 5'-W C G C A W-3'	PyImPyPy-γ-HpImPyIm
	229) 5'-W C C T T W-3'	PyPyHpHp-γ-PyPyImIm
	230) 5'-W C C T A W-3'	PyPyHpPy-γ-HpPyImIm
	231) 5'-W C C T G W-3'	PyPyHpIm-γ-PyPyImIm
20	232) 5'-W C C T C W-3'	PyPyHpPy-γ-ImPyImIm
	233) 5'-W C C A T W-3'	PyPyPyHp-γ-PyHpImIm
	234) 5'-W C C A A W-3'	PyPyPyPy-γ-HpHpImIm
	235) 5'-W C C A G W-3'	PyPyPyIm-γ-PyHpImIm
	236) 5'-W C C A C W-3'	PyPyPyPy-γ-ImHpImIm
25	237) 5'-W C C G T W-3'	PyPyImHp-γ-PyPyImIm
	238) 5'-W C C G A W-3'	PyPyImPy-γ-HpPyImIm
	239) 5'-W C C C T W-3'	PyPyPyHp-γ-PyImImIm
	240) 5'-W C C C A W-3'	PyPyPyPy-γ-HpImImIm
G9)	5'-W C G G G W-3'	PyImImIm-γ-PyPyPyIm
G10)	5'-W C G G C W-3'	PyImImPy-γ-ImPyPyIm
30	G11) 5'-W C G C G W-3'	PyImPyIm-γ-PyImPyIm
	G12) 5'-W C G C C W-3'	PyImPyPy-γ-ImImPyIm
	G13) 5'-W C C G G W-3'	PyPyImIm-γ-PyPyImIm
	G14) 5'-W C C G C W-3'	PyPyImPy-γ-ImPyImIm
	G15) 5'-W C C C G W-3'	PyPyPyIm-γ-PyImImIm
35	G16) 5'-W C C C C W-3'	PyPyPyPy-γ-ImImImIm

TABLE 12: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGWNW-3'
with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	3 β) 5'-W G T T G W-3'	ImHp- β -Im- γ -PyPyPyPy
5	7 β) 5'-W G T A G W-3'	ImHp- β -Im- γ -PyHpPyPy
	9 β) 5'-W G T G T W-3'	Im- β -ImHp- γ -PyPyPyPy
	10 β) 5'-W G T G A W-3'	Im- β -ImPy- γ -HpPyPyPy
	11 β) 5'-W G T G G W-3'	Im- β -ImIm- γ -PyPyPyPy
	12 β) 5'-W G T G C W-3'	Im- β -ImPy- γ -ImPyPyPy
10	15 β) 5'-W G T C G W-3'	ImHp- β -Im- γ -PyImPyPy
	19 β) 5'-W G A T G W-3'	ImPy- β -Im- γ -PyPyHpPy
	23 β) 5'-W G A A G W-3'	ImPy- β -Im- γ -PyHpHpPy
	25 β) 5'-W G A G T W-3'	Im- β -ImHp- γ -PyPyHpPy
	26 β) 5'-W G A G A W-3'	Im- β -ImPy- γ -HpPyHpPy
15	27 β) 5'-W G A G G W-3'	Im- β -ImIm- γ -PyPyHpPy
	28 β) 5'-W G A G C W-3'	Im- β -ImPy- γ -ImPyHpPy
	31 β) 5'-W G A C G W-3'	ImPy- β -Im- γ -PyImHpPy

TABLE 13: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WGSNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	35 β) 5'-W G G T G W-3'	ImIm- β -Im- γ -PyPyPyPy
5	39 β) 5'-W G G A G W-3'	ImIm- β -Im- γ -PyHpPyPy
	45 β) 5'-W G C T T W-3'	ImPyHpHp- γ -Py- β -ImPy
	46 β) 5'-W G C T A W-3'	ImPyHpPy- γ -Hp- β -ImPy
	47 β) 5'-W G C T G W-3'	ImPyHpIm- γ -Py- β -ImPy
	47 β 2) 5'-W G C T G W-3'	ImPy- β -Im- γ -Py- β -ImPy
10	48 β) 5'-W G C T C W-3'	ImPyHpPy- γ -Im- β -ImPy
	49 β) 5'-W G C A T W-3'	ImPyPyHp- γ -Py- β -ImPy
	50 β) 5'-W G C A A W-3'	ImPyPyPy- γ -Hp- β -ImPy
	51 β) 5'-W G C A G W-3'	ImPyPyIm- γ -Py- β -ImPy
	51 β 2) 5'-W G C A G W-3'	ImPy- β -Im- γ -Py- β -ImPy
15	52 β) 5'-W G C A C W-3'	ImPyPyPy- γ -Im- β -ImPy
	53 β) 5'-W G C G T W-3'	ImPyImHp- γ -Py- β -ImPy
	53 β 2) 5'-W G C G T W-3'	Im- β -ImHp- γ -Py- β -ImPy
	54 β) 5'-W G C G A W-3'	ImPyImPy- γ -Hp- β -ImPy
	54 β 2) 5'-W G C G A W-3'	Im- β -ImPy- γ -Hp- β -ImPy
20	G3 β) 5'-W G G C G W-3'	ImIm- β -Im- γ -PyImPyPy
	G5 β) 5'-W G C G G W-3'	ImPyImIm- γ -Py- β -ImPy
	G5 β 2) 5'-W G C G G W-3'	Im- β -ImIm- γ -Py- β -ImPy
	G6 β) 5'-W G C G C W-3'	ImPyImPy- γ -Im- β -ImPy
	G6 β 2) 5'-W G C G C W-3'	Im- β -ImPy- γ -Im- β -ImPy
25	G7 β) 5'-W G C C G W-3'	ImPy- β -Im- γ -PyImImPy

TABLE 14: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTWNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	59 β) 5'-W T T T G W-3'	HpHp- β -Im- γ -PyPyPyPy
5	63 β) 5'-W T T A G W-3'	HpHp- β -Im- γ -PyHpPyPy
	65 β) 5'-W T T G T W-3'	Hp- β -ImHp- γ -PyPyPyPy
	66 β) 5'-W T T G A W-3'	Hp- β -ImPy- γ -HpPyPyPy
	67 β) 5'-W T T G G W-3'	Hp- β -ImIm- γ -PyPyPyPy
	68 β) 5'-W T T G C W-3'	Hp- β -ImPy- γ -ImPyPyPy
10	71 β) 5'-W T T C G W-3'	HpHp- β -Im- γ -PyImPyPy
	75 β) 5'-W T A T G W-3'	HpPy- β -Im- γ -PyPyHpPy
	79 β) 5'-W T A A G W-3'	HpPy- β -Im- γ -PyHpHpPy
	81 β) 5'-W T A G T W-3'	Hp- β -ImHp- γ -PyPyHpPy
	82 β) 5'-W T A G A W-3'	Hp- β -ImPy- γ -HpPyHpPy
15	83 β) 5'-W T A G G W-3'	Hp- β -ImIm- γ -PyPyHpPy
	84 β) 5'-W T A G C W-3'	Hp- β -ImPy- γ -ImPyHpPy
	87 β) 5'-W T A C G W-3'	HpPy- β -Im- γ -PyImHpPy

TABLE 15: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WTSNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
5	91 β) 5'-W T G T G W-3'	HpIm- β -Im- γ -PyPyPyPy
	95 β) 5'-W T G A G W-3'	HpIm- β -Im- γ -PyHpPyPy
	103 β) 5'-W T G C G W-3'	HpIm- β -Im- γ -PyImPyPy
	105 β) 5'-W T C T T W-3'	HpPyHpHp- γ -Py- β -ImPy
	106 β) 5'-W T C T A W-3'	HpPyHpPy- γ -Hp- β -ImPy
	107 β) 5'-W T C T G W-3'	HpPyHpIm- γ -Py- β -ImPy
10	107 β 2) 5'-W T C T G W-3'	HpPy- β -Im- γ -Py- β -ImPy
	108 β) 5'-W T C T C W-3'	HpPyHpPy- γ -Im- β -ImPy
	109 β) 5'-W T C A T W-3'	HpPyPyHp- γ -Py- β -ImPy
	110 β) 5'-W T C A A W-3'	HpPyPyPy- γ -Hp- β -ImPy
	111 β) 5'-W T C A G W-3'	HpPyPyIm- γ -Py- β -ImPy
15	111 β 2) 5'-W T C A G W-3'	HpPy- β -Im- γ -Py- β -ImPy
	112 β) 5'-W T C A C W-3'	HpPyPyPy- γ -Im- β -ImPy
	113 β) 5'-W T C G T W-3'	HpPyImHp- γ -Py- β -ImPy
	113 β 2) 5'-W T C G T W-3'	Hp- β -ImHp- γ -Py- β -ImPy
	114 β) 5'-W T C G A W-3'	HpPyImPy- γ -Hp- β -ImPy
20	114 β 2) 5'-W T C G A W-3'	Hp- β -ImPy- γ -Hp- β -ImPy
	117 β) 5'-W T C G G W-3'	HpPyImIm- γ -Py- β -ImPy
	117 β 2) 5'-W T C G G W-3'	Hp- β -ImIm- γ -Py- β -ImPy
	118 β) 5'-W T C G C W-3'	HpPyImPy- γ -Im- β -ImPy
	118 β 2) 5'-W T C G C W-3'	Hp- β -ImPy- γ -Im- β -ImPy
25	119 β) 5'-W T C C G W-3'	HpPy- β -Im- γ -PyImImPy

TABLE 16: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WA WNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	123 β) 5'-W A T T G W-3'	PyHp- β -Im- γ -PyPyPyHp
5	127 β) 5'-W A T A G W-3'	PyHp- β -Im- γ -PyHpPyHp
	129 β) 5'-W A T G T W-3'	Py- β -ImHp- γ -PyPyPyHp
	130 β) 5'-W A T G A W-3'	Py- β -ImPy- γ -HpPyPyHp
	131 β) 5'-W A T G G W-3'	Py- β -ImIm- γ -PyPyPyHp
	132 β) 5'-W A T G C W-3'	Py- β -ImPy- γ -ImPyPyHp
10	135 β) 5'-W A T C G W-3'	PyHp- β -Im- γ -PyImPyHp
	139 β) 5'-W A A T G W-3'	PyPy- β -Im- γ -PyPyHpHp
	143 β) 5'-W A A A G W-3'	PyPy- β -Im- γ -PyHpHpHp
	145 β) 5'-W A A G T W-3'	Py- β -ImHp- γ -PyPyHpHp
	146 β) 5'-W A A G A W-3'	Py- β -ImPy- γ -HpPyHpHp
15	147 β) 5'-W A A G G W-3'	Py- β -ImIm- γ -PyPyHpHp
	148 β) 5'-W A A G C W-3'	Py- β -ImPy- γ -ImPyHpHp
	151 β) 5'-W A A C G W-3'	PyPy- β -Im- γ -PyImHpHp

TABLE 17: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WASNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	155β) 5'-W A G T G W-3'	PyIm- β -Im- γ -PyPyPyHp
5	159β) 5'-W A G A G W-3'	PyIm- β -Im- γ -PyHpPyHp
	167β) 5'-W A G C G W-3'	PyIm- β -Im- γ -PyImPyHp
	169β) 5'-W A C T T W-3'	PyPyHpHp- γ -Py- β -ImHp
	170β) 5'-W A C T A W-3'	PyPyHpPy- γ -Hp- β -ImHp
	171β) 5'-W A C T G W-3'	PyPyHpIm- γ -Py- β -ImHp
10	171β2) 5'-W A C T G W-3'	PyPy- β -Im- γ -Py- β -ImHp
	172β) 5'-W A C T C W-3'	PyPyHpPy- γ -Im- β -ImHp
	173β) 5'-W A C A T W-3'	PyPyPyHp- γ -Py- β -ImHp
	174β) 5'-W A C A A W-3'	PyPyPyPy- γ -Hp- β -ImHp
	175β) 5'-W A C A G W-3'	PyPyPyIm- γ -Py- β -ImHp
15	175β2) 5'-W A C A G W-3'	PyPy- β -Im- γ -Py- β -ImHp
	176β) 5'-W A C A C W-3'	PyPyPyPy- γ -Im- β -ImHp
	177β) 5'-W A C G T W-3'	PyPyImHp- γ -Py- β -ImHp
	177β2) 5'-W A C G T W-3'	Py- β -ImHp- γ -Py- β -ImHp
	178β) 5'-W A C G A W-3'	PyPyImPy- γ -Hp- β -ImHp
20	178β2) 5'-W A C G A W-3'	Py- β -ImPy- γ -Hp- β -ImHp
	181β) 5'-W A C G G W-3'	PyPyImIm- γ -Py- β -ImHp
	181β2) 5'-W A C G G W-3'	Py- β -ImIm- γ -Py- β -ImHp
	182β) 5'-W A C G C W-3'	PyPyImPy- γ -Im- β -ImHp
	182β2) 5'-W A C G C W-3'	Py- β -ImPy- γ -Im- β -ImHp
25	183β2) 5'-W A C C G W-3'	PyPy- β -Im- γ -PyImImHp

TABLE 18: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCWNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	185 β) 5'-W C T T T W-3'	PyH _p H _p H _p - γ -PyPy- β -Im
5	186 β) 5'-W C T T A W-3'	PyH _p H _p Py- γ -H _p Py- β -Im
	187 β) 5'-W C T T G W-3'	PyH _p H _p Im- γ -PyPy- β -Im
	187 β 2) 5'-W C T T G W-3'	PyH _p - β -Im- γ -PyPy- β -Im
	188 β) 5'-W C T T C W-3'	PyH _p H _p Py- γ -ImPy- β -Im
	189 β) 5'-W C T A T W-3'	PyH _p PyH _p - γ -PyH _p - β -Im
10	190 β) 5'-W C T A A W-3'	PyH _p PyPy- γ -H _p H _p - β -Im
	191 β) 5'-W C T A G W-3'	PyH _p PyIm- γ -PyH _p - β -Im
	191 β 2) 5'-W C T A G W-3'	PyH _p - β -Im- γ -PyH _p - β -Im
	192 β) 5'-W C T A C W-3'	PyH _p PyPy- γ -ImH _p - β -Im
	193 β) 5'-W C T G T W-3'	PyH _p ImH _p - γ -PyPy- β -Im
15	193 β 2) 5'-W C T G T W-3'	Py- β -ImH _p - γ -PyPy- β -Im
	194 β) 5'-W C T G A W-3'	PyH _p ImPy- γ -H _p Py- β -Im
	194 β 2) 5'-W C T G A W-3'	Py- β -ImPy- γ -H _p Py- β -Im
	195 β) 5'-W C T G G W-3'	PyH _p ImIm- γ -PyPy- β -Im
	195 β 2) 5'-W C T G G W-3'	Py- β -ImIm- γ -PyPy- β -Im
20	196 β) 5'-W C T G C W-3'	PyH _p ImPy- γ -ImPy- β -Im
	196 β 2) 5'-W C T G C W-3'	Py- β -ImPy- γ -ImPy- β -Im
	197 β) 5'-W C T C T W-3'	PyH _p PyH _p - γ -PyIm- β -Im
	198 β) 5'-W C T C A W-3'	PyH _p PyPy- γ -H _p Im- β -Im
	199 β) 5'-W C T C G W-3'	PyH _p PyIm- γ -PyIm- β -Im
25	199 β 2) 5'-W C T C G W-3'	PyH _p - β -Im- γ -PyIm- β -Im
	200 β) 5'-W C T C C W-3'	PyH _p PyPy- γ -ImIm- β -Im
	201 β) 5'-W C A T T W-3'	PyPyH _p H _p - γ -PyPy- β -Im
	202 β) 5'-W C A T A W-3'	PyPyH _p Py- γ -H _p Py- β -Im
	203 β) 5'-W C A T G W-3'	PyPyH _p Im- γ -PyPy- β -Im
30	203 β 2) 5'-W C A T G W-3'	PyPy- β -Im- γ -PyPy- β -Im
	204 β) 5'-W C A T C W-3'	PyPyH _p Py- γ -ImPy- β -Im
	205 β) 5'-W C A A T W-3'	PyPyPyH _p - γ -PyH _p - β -Im
	206 β) 5'-W C A A A W-3'	PyPyPyPy- γ -H _p H _p - β -Im

TABLE 18 (cont): 8-ring Hairpin Polyamides for 6-bp 5'-WCWNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	207 β) 5'-W C A A G W-3'	PyPyPyIm- γ -PyHp- β -Im
5	207 β 2) 5'-W C A A G W-3'	PyPy- β -Im- γ -PyHp- β -Im
	208 β) 5'-W C A A C W-3'	PyPyPyPy- γ -ImHp- β -Im
	209 β) 5'-W C A G T W-3'	PyPyImHp- γ -PyPy- β -Im
	209 β 2) 5'-W C A G T W-3'	Py- β -ImHp- γ -PyPy- β -Im
10	210 β) 5'-W C A G A W-3'	PyPyImPy- γ -HpPy- β -Im
	210 β 2) 5'-W C A G A W-3'	Py- β -ImPy- γ -HpPy- β -Im
	211 β) 5'-W C A G G W-3'	PyPyImIm- γ -PyPy- β -Im
	211 β 2) 5'-W C A G G W-3'	Py- β -ImIm- γ -PyPy- β -Im
	212 β) 5'-W C A G C W-3'	PyPyImPy- γ -ImPy- β -Im
	212 β 2) 5'-W C A G C W-3'	Py- β -ImPy- γ -ImPy- β -Im
15	213 β) 5'-W C A C T W-3'	PyPyPyHp- γ -PyIm- β -Im
	214 β) 5'-W C A C A W-3'	PyPyPyPy- γ -HpIm- β -Im
	215 β) 5'-W C A C G W-3'	PyPyPyIm- γ -PyIm- β -Im
	215 β 2) 5'-W C A C G W-3'	PyPy- β -Im- γ -PyIm- β -Im
	216 β) 5'-W C A C C W-3'	PyPyPyPy- γ -ImIm- β -Im

TABLE 19: 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCSNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
	217 β) 5'-W C G T T W-3'	PyImHpHp- γ -PyPy- β -Im
5	218 β) 5'-W C G T A W-3'	PyImHpPy- γ -HpPy- β -Im
	219 β) 5'-W C G T G W-3'	PyImHpIm- γ -PyPy- β -Im
	219 β 2) 5'-W C G T G W-3'	PyIm- β -Im- γ -PyPy- β -Im
	220 β) 5'-W C G T C W-3'	PyImHpPy- γ -ImPy- β -Im
10	221 β) 5'-W C G A T W-3'	PyImPyHp- γ -PyHp- β -Im
	222 β) 5'-W C G A A W-3'	PyImPyPy- γ -HpHp- β -Im
	223 β) 5'-W C G A G W-3'	PyImPyIm- γ -PyHp- β -Im
	223 β 2) 5'-W C G A G W-3'	PyIm- β -Im- γ -PyHp- β -Im
	224 β) 5'-W C G A C W-3'	PyImPyPy- γ -ImHp- β -Im
15	225 β) 5'-W C G G T W-3'	PyImImHp- γ -PyPy- β -Im
	226 β) 5'-W C G G A W-3'	PyImImPy- γ -HpPy- β -Im
	227 β) 5'-W C G C T W-3'	PyImPyHp- γ -PyIm- β -Im
	228 β) 5'-W C G C A W-3'	PyImPyPy- γ -HpIm- β -Im
	229 β) 5'-W C C T T W-3'	PyPyHpHp- γ -Py- β -ImIm
	230 β) 5'-W C C T A W-3'	PyPyHpPy- γ -Hp- β -ImIm
20	231 β) 5'-W C C T G W-3'	PyPyHpIm- γ -Py- β -ImIm
	231 β 2) 5'-W C C T G W-3'	PyPy- β -Im- γ -Py- β -ImIm
	232 β) 5'-W C C T C W-3'	PyPyHpPy- γ -Im- β -ImIm
	233 β) 5'-W C C A T W-3'	PyPyPyHp- γ -Py- β -ImIm
	234 β) 5'-W C C A A W-3'	PyPyPyPy- γ -Hp- β -ImIm
25	235 β) 5'-W C C A G W-3'	PyPyPyIm- γ -Py- β -ImIm
	235 β 2) 5'-W C C A G W-3'	PyPy- β -Im- γ -Py- β -ImIm
	236 β) 5'-W C C A C W-3'	PyPyPyPy- γ -Im- β -ImIm
	237 β) 5'-W C C G T W-3'	PyPyImHp- γ -Py- β -ImIm
	237 β 2) 5'-W C C G T W-3'	Py- β -ImHp- γ -Py- β -ImIm
30	238 β) 5'-W C C G A W-3'	PyPyImPy- γ -Hp- β -ImIm
	238 β 2) 5'-W C C G A W-3'	Py- β -ImPy- γ -Hp- β -ImIm
	G9 β) 5'-W C G G G W-3'	PyImImIm- γ -PyPy- β -Im
	G10 β) 5'-W C G G C W-3'	PyImImPy- γ -ImPy- β -Im

TABLE 19 (cont): 8-ring Hairpin Polyamides for recognition of 6-bp 5'-WCSNNW-3' with β -substitutions included.

	DNA sequence	aromatic amino acid sequence
5	G11 β) 5'-W C G C G W-3'	PyImPyIm- γ -PyIm- β -Im
	G11 β 2) 5'-W C G C G W-3'	PyIm- β -Im- γ -PyIm- β -Im
	G12 β) 5'-W C G C C W-3'	PyImPyPy- γ -ImIm- β -Im
	G13 β) 5'-W C C G G W-3'	PyPyImIm- γ -Py- β -ImIm
	G13 β 2) 5'-W C C G G W-3'	Py- β -ImIm- γ -Py- β -ImIm
10	G14 β) 5'-W C C G C W-3'	PyPyImPy- γ -Im- β -ImIm
	G14 β 2) 5'-W C C G C W-3'	Py- β -ImPy- γ -Im- β -ImIm
	G15 β) 5'-W C C C G W-3'	PyPy- β -Im- γ -PyImIm

15 If the process described above of designing a preferred polyamide molecule X₁X₂X₃X₄- γ -X₅X₆X₇X₈ comprising eight aromatic aminoacid residues does not produce a selective polyamide that binds to the target identified DNA sequence with subnanomolar affinity and with a selectivity over mismatch sequences of greater than a factor of ten, a polyamide molecule X₁X₂X₃X₄X₅- γ -X₆X₇X₈X₉X₁₀ having five carboxamide binding pairs can be designed that is 20 selective for a seven base pair identified target 5'-WNNNNNW-3' sequence. The design and synthesis of the five binding pair polyamide is similar to that of the four binding pair polyamide X₁X₂X₃X₄- γ -X₅X₆X₇X₈ described above.

25 The polyamide design process, shown schematically in Figure 7 provides a method for designing a ten carboxamide residue molecule comprising five carboxamide binding pairs for selective detection and binding of a target seven base pair 5'-WNNNNNW-3' sequence in the minor groove of double stranded DNA. The design process identifies an appropriate polyamide ligand for recognition of a predetermined seven base pair, 5'-WNNNNNW-3' sequence with subnanomolar affinity and >10-fold specificity versus mismatch sites. Trauger, J.W., Baird, E. 30 E. Dervan, P.B. describes the recognition of DNA by designed ligands at subnanomolar concentrations. *Nature* 382, 559-561 (1996).

In order to prepare a polyamide molecule specific for an identified seven base pair sequence of double stranded DNA, a user starts the 10-ring hairpin design process that 35 implements the minor groove recognition pairing code summarized in Table 2 above. In the

design process a 5'-WN>NNNNW-3' sequence was identified. In a preferred embodiment, the identified sequence was located within a gene promoter. The identified sequence was then defined as 5'-W_abcd_eW-3' in a stepwise process wherein *a*, *b*, *c*, *d*, and *e*, were sequentially and independently defined as A, G, C, or T. The structure of the polyamide molecule was then correspondingly defined by sequentially choosing antiparallel carboxamide binding pairs according to the minor groove pairing code summarized in Table 2 above. Thus, if *a* was G, then X₁ was defined as Im, and X₁₀ was defined as Py. If *a* was C, then X₁ was defined as Py, and X₁₀ was defined as Im. If *a* was T, then X₁ was defined as Hp, and X₁₀ was defined as Py. If *a* was A, then X₁ was defined as Py, and X₁₀ was defined as Hp.

10

Similarly, *b* was defined as A, G, C, or T and corresponding carboxamide binding pairs were defined. According to the same rules, if *b* was G, then X₂ was defined as Im, and X₉ was defined as Py. If *b* was C, then X₂ was defined as Py, and X₉ was defined as Im. Likewise, if *b* was T, then X₂ was defined as Hp, and X₉ was defined as Py. If *b* was A, then X₂ was defined as Py, and X₉ was defined as Hp.

15

The next step was to define *c* as A, G, C, or T and then define corresponding carboxamide binding pairs. Following the same rules, if *c* was G, then X₃ was defined as Im, and X₈ was defined as Py. If *c* was C, then X₃ was defined as Py, and X₈ was defined as Im. Similarly, if *c* was T, then X₃ was defined as Hp, and X₈ was defined as Py. If *c* was A, then X₃ was defined as Py, and X₈ was defined as Hp. Similarly, *d* was defined as A, G, C, or T and the corresponding carboxamide binding pair was defined. According to the above rules, if *d* was G, then X₄ was defined as Im, and X₇ was defined as Py. If *d* was C, then X₄ was defined as Py, and X₇ was defined as Im. If *d* was T, then X₄ was defined as Hp, and X₇ was defined as Py. If *d* was A, then X₄ was defined as Py, and X₇ was defined as Hp. Finally, *e* was defined as A, G, C, or T and the corresponding carboxamide binding pair was defined. According to the above rules, if *e* was G, then X₅ was defined as Im, and X₆ was defined as Py. If *e* was C, then X₅ was defined as Py, and X₆ was defined as Im. If *e* was T, then X₅ was defined as Hp, and X₆ was defined as Py. If *e* was A, then X₅ was defined as Py, and X₆ was defined as Hp.

20
25
30

With all ten carboxamide residues that participate in the binding pairs now defined, the designed polyamide X₁X₂X₃X₄X₅-γ-X₆X₇X₈X₉X₁₀ suitable for binding to the identified

-42-

sequence was synthesized using known techniques. Baird, E. E. & Dervan, P. B. describes the solid phase synthesis of polyamides containing imidazole and pyrrole amino acids: *J. Am. Chem. Soc.* 118, 6141-6146 (1996); also see PCT US 97/003332.

5 The binding affinity of the synthesized polyamide to the identified sequence was determined using a quantitative DNase footprint titration method for studying protein-DNA interactions described by Brenowitz, M., Senear, D. F., Shea, M. A. & Ackers, G. K., *Methods Enzymol.* 130, 132-181 (1986). If the affinity of the synthesized polyamide at the target site was not subnanomolar affinity then substituting at least one β -alanine residue for a pyrrole or 3-hydroxypyrrole residue was considered in order to optimize the exact positions of the binding pairs of aromatic amino acids. If the affinity of the polyamide at the target site was subnanomolar affinity then the sequence specificity of the polyamide versus mismatch sequences was determined. If the specificity versus mismatch sites was not > 10-fold specificity then adding a β -alanine (shown schematically in Figure 8) was considered, in order to optimize 10 the positions of the aromatic amino acids in relationship to the base pairs in the minor groove. Specificity of the polyamide molecule for the target identified sequence versus mismatch 15 sequence sites of greater than 10-fold was considered a successful result of design process.

20 The 1024 polyamide molecules comprising five carboxamide binding pairs that were designed using this method are useful for binding to the 1024 target 5'-NNNNN-3' core sequences, and are listed in Tables 20-51. A corresponding polyamide molecule was designed for each DNA sequence (241-1232) and (G17-G48) using the process outlined above and shown 25 schematically in Figure 7.

30 If the synthesized polyamide molecule did not bind to the target identified sequence with subnanomolar affinity or if the synthesized polyamide molecule did not exhibit a specificity for the target identified sequence versus mismatch sequence sites of greater than 10-fold, the option of substituting an aliphatic amino acid residue for one of the carboxamide residues was considered. The preferred aliphatic amino acid residue is β -alanine. At least one aliphatic amino acid residue such as a β -alanine residue provided some flexibility to the central portion of the polyamide molecule, acting as a "spring" to permit optimization of the hydrogen bonding between the carboxamide binding pairs and the nucleotide bases of the double stranded DNA.

In general, it was not found to be advantageous to replace either member of the terminal carboxamide binding pair, X₁/X₁₀, with β -alanine. Similarly, β -alanine was not substituted for members of the binding pair, X₅/X₆, adjacent to the γ hairpin residue. β -alanine residues were not substituted for N-methylimidazole residues. The use of β -alanine in place of a pyrrole or 3-hydroxypyrrrole amino acid residue provides aromatic/aliphatic pairing (Im/ β , β /Im, Hp/ β , β /Hp, Py/ β , and β /Py) and aliphatic/aliphatic pairing (β / β) substitution.

The method for selecting which pyrrole amino acid to substitute with β -alanine is schematically illustrated in Figure 8. Selective placement of an aliphatic β -alanine (β) residue paired with either a pyrrole (Py), 3-hydroxypyrrrole (Hp), or imidazole (Im) aromatic amino acid or another β -alanine residue is found to compensate for sequence composition effects to improve recognition and binding of the minor groove of DNA by pyrrole-imidazole polyamides of the present invention. If an all-ring polyamide has been found to have an affinity which is not subnanomolar, or a specificity versus mismatch sequences which is less than 10-fold it may be caused by DNA sequence-composition effects which can be reduced by replacement of an aromatic amino acid with an aliphatic β -alanine residue. In a polyamide molecule that comprises five binding pairs it is only beneficial to place β -alanine in positions X₂, X₃, X₄, X₇, X₈, and X₉. No more than two β -alanine residues may be placed within a single hairpin structure. No more than a single β -residue may be placed within each individual polyamide subunit, e.g., if X₂ is replaced with β -alanine, X₃ or X₄ cannot be replaced as well.

These rules and others were implemented in the method schematically illustrated in Figure 8. This process is suitable for the refinement of the design polyamide comprising five binding pairs that has been designed by the method illustrated in Figure 7, but which lacks subnanomolar affinity or greater than 10-fold specificity at the identified target DNA sequence. As in the basic design method, the designed polyamides are synthesized and the affinity and specificity of binding to the target DNA were determined.

As discussed above, for a given 10-ring polyamide molecule there are six possible outcomes for the process of substituting a β -alanine residue for an aromatic amino acid residue. First, there may be no position at which it is possible to add a β -alanine residue; in such case, a better binding affinity or selectivity can be sought in the design and synthesis of a polyamide

-44-

with four or six carboxamide binding pairs, described below. Second, the process may result in a derivative which contains a single β -alanine substitution (such derivatives are numbered according to the parent numbering scheme such that a single β -derivative of compound 5 would be called 5 β), which is sufficient to produce subnanomolar binding affinity and >10-fold specificity, and at which point the process is deemed complete.

Third, the process of Figure 8 may result in a polyamide which contains a single β -alanine substitution which is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there are no additional positions in which it is possible to substitute a β -alanine residue, and in such a case a paired β -alanine residue should be added as described in Figure 9 and text below. Fourth, the process of Figure 7 may result in a polyamide that contains a single β -alanine substitution that is not sufficient to produce subnanomolar binding affinity and >10-fold specificity, but where there is an additional position for β -alanine substitution that does produce a polyamide with the criterion level of affinity and selectivity. Tables 52-83 list polyamide compounds 241 β -1232 β and G17 β -G48 β , corresponding to DNA sequences 241-1232 and G17 – G48, that contain one or two β -alanine residues.

A fifth possibility is that substitution at a second position by the method illustrated in Figure 9 with a paired β -alanine residue is not sufficient to produce a polyamide having the subnanomolar binding affinity and >10-fold specificity, and a polyamide with four or six carboxamide binding pairs, should be designed and synthesized, as described below. Finally, the design process may result in a polyamide that has a paired β -alanine substitution that is sufficient to produce subnanomolar binding affinity and >10-fold specificity, and therefore the design process is deemed complete. Tables 52-83 list polyamide compounds 241 β -1232 β and G17 β -G48 β , corresponding to DNA sequences 241-1232 and G17 – G48, that contain one or two β -alanine residues. In addition, Tables 52-83 list polyamides corresponding to sequences (241-1232) and (G17-G48) labeled (241 β p-1232 β p) and (G17 β p-G48 β p) that contain paired β/β residues added by the process described in Figure 9.

TABLE 20: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	241) 5'-W G G T T T W-3'	I _m I _m H _p H _p H _p -γ-PyPyPyPyPy
5	242) 5'-W G G T T A W-3'	I _m I _m H _p H _p Py-γ-HpPyPyPyPy
	243) 5'-W G G T T G W-3'	I _m I _m H _p H _p I _m -γ-PyPyPyPyPy
	244) 5'-W G G T T C W-3'	I _m I _m H _p H _p Py-γ-I _m PyPyPyPy
	245) 5'-W G G T A T W-3'	I _m I _m H _p PyH _p -γ-PyH _p PyPyPy
	246) 5'-W G G T A A W-3'	I _m I _m H _p PyPy-γ-HpH _p PyPy
10	247) 5'-W G G T A G W-3'	I _m I _m H _p PyI _m -γ-PyH _p PyPy
	248) 5'-W G G T A C W-3'	I _m I _m H _p PyPy-γ-I _m H _p PyPy
	249) 5'-W G G T G T W-3'	I _m I _m H _p I _m H _p -γ-PyPyPyPy
	250) 5'-W G G T G A W-3'	I _m I _m H _p I _m Py-γ-HpPyPyPy
	251) 5'-W G G T G G W-3'	I _m I _m H _p I _m I _m -γ-PyPyPyPy
15	252) 5'-W G G T G C W-3'	I _m I _m H _p I _m Py-γ-I _m PyPyPy
	253) 5'-W G G T C T W-3'	I _m I _m H _p PyH _p -γ-PyI _m PyPy
	254) 5'-W G G T C A W-3'	I _m I _m H _p PyPy-γ-HpI _m PyPy
	255) 5'-W G G T C G W-3'	I _m I _m H _p PyI _m -γ-PyI _m PyPy
	256) 5'-W G G T C C W-3'	I _m I _m H _p PyPy-γ-I _m I _m PyPy
20	257) 5'-W G G A T T W-3'	I _m I _m PyH _p H _p -γ-PyPyH _p Py
	258) 5'-W G G A T A W-3'	I _m I _m PyH _p Py-γ-HpPyH _p Py
	259) 5'-W G G A T G W-3'	I _m I _m PyH _p I _m -γ-PyPyH _p Py
	260) 5'-W G G A T C W-3'	I _m I _m PyH _p Py-γ-I _m PyH _p Py
	261) 5'-W G G A A T W-3'	I _m I _m PyH _p -γ-PyH _p H _p Py
25	262) 5'-W G G A A A W-3'	I _m I _m PyPyPy-γ-HpH _p H _p Py
	263) 5'-W G G A A G W-3'	I _m I _m PyPyI _m -γ-PyH _p H _p Py
	264) 5'-W G G A A C W-3'	I _m I _m PyPyPy-γ-I _m H _p H _p Py
	265) 5'-W G G A G T W-3'	I _m I _m PyI _m H _p -γ-PyPyH _p Py
	266) 5'-W G G A G A W-3'	I _m I _m PyI _m Py-γ-HpPyH _p Py
30	267) 5'-W G G A G G W-3'	I _m I _m PyI _m I _m -γ-PyPyH _p Py
	268) 5'-W G G A G C W-3'	I _m I _m PyI _m Py-γ-I _m PyH _p Py
	269) 5'-W G G A C T W-3'	I _m I _m PyH _p -γ-PyI _m H _p Py
	270) 5'-W G G A C A W-3'	I _m I _m PyPyPy-γ-HpI _m H _p Py
	271) 5'-W G G A C G W-3'	I _m I _m PyH _p -γ-PyI _m H _p Py
35	272) 5'-W G G A C C W-3'	I _m I _m PyPyPy-γ-I _m I _m H _p Py

TABLE 21: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGSNW-3'

	DNA sequence	aromatic amino acid sequence
	273) 5'-W G G G T T W-3'	ImImImHpHp-γ-PyPyPyPyPy
5	274) 5'-W G G G T A W-3'	ImImImHpPy-γ-HpPyPyPyPy
	275) 5'-W G G G T G W-3'	ImImImHpIm-γ-PyPyPyPyPy
	276) 5'-W G G G T C W-3'	ImImImHpPy-γ-ImPyPyPyPy
	277) 5'-W G G G A T W-3'	ImImImPyHp-γ-PyHpPyPyPy
	278) 5'-W G G G A A W-3'	ImImImPyPy-γ-HpHpPyPyPy
10	279) 5'-W G G G A G W-3'	ImImImPyIm-γ-PyHpPyPyPy
	280) 5'-W G G G A C W-3'	ImImImPyPy-γ-ImHpPyPyPy
	281) 5'-W G G G G T W-3'	ImImImImHp-γ-PyPyPyPyPy
	282) 5'-W G G G G A W-3'	ImImImImPy-γ-HpPyPyPyPy
	283) 5'-W G G G C T W-3'	ImImImPyHp-γ-PyImPyPyPy
15	284) 5'-W G G G C A W-3'	ImImImPyPy-γ-HpImPyPyPy
	285) 5'-W G G C T T W-3'	ImImPyHpHp-γ-PyPyImPyPy
	286) 5'-W G G C T A W-3'	ImImPyHpPy-γ-HpPyImPyPy
	287) 5'-W G G C T G W-3'	ImImPyHpIm-γ-PyPyImPyPy
	288) 5'-W G G C T C W-3'	ImImPyHpPy-γ-ImPyImPyPy
20	289) 5'-W G G C A T W-3'	ImImPyPyHp-γ-PyHpImPyPy
	290) 5'-W G G C A A W-3'	ImImPyPyPy-γ-HpHpImPyPy
	291) 5'-W G G C A G W-3'	ImImPyPyIm-γ-PyHpImPyPy
	292) 5'-W G G C A C W-3'	ImImPyPyPy-γ-ImHpImPyPy
	293) 5'-W G G C G T W-3'	ImImPyImHp-γ-PyPyImPyPy
25	294) 5'-W G G C G A W-3'	ImImPyImPy-γ-HpPyImPyPy
	295) 5'-W G G C C T W-3'	ImImPyPyHp-γ-PyImImPyPy
	296) 5'-W G G C C A W-3'	ImImPyPyPy-γ-HpImImPyPy
	G17) 5'-W G G G G G W-3'	ImImImImIm-γ-PyPyPyPyPy
	G18) 5'-W G G G G C W-3'	ImImImImPy-γ-ImPyPyPyPy
30	G19) 5'-W G G G C G W-3'	ImImImPyIm-γ-PyImPyPyPy
	G20) 5'-W G G G C C W-3'	ImImImPyPy-γ-ImImPyPyPy
	G21) 5'-W G G C G G W-3'	ImImPyImIm-γ-PyPyImPyPy
	G22) 5'-W G G C G C W-3'	ImImPyImPy-γ-ImPyImPyPy
	G23) 5'-W G G C C G W-3'	ImImPyPyIm-γ-PyImImPyPy
35	G24) 5'-W G G C C C W-3'	ImImPyPyPy-γ-ImImImPyPy

TABLE 22: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
	297) 5'-W G T T T T W-3'	ImHpHpHpH _p -γ-PyPyPyPyPy
5	298) 5'-W G T T T A W-3'	ImHpHpHpPy-γ-HpPyPyPyPy
	299) 5'-W G T T T G W-3'	ImHpHpHpIm-γ-PyPyPyPyPy
	300) 5'-W G T T T C W-3'	ImHpHpHpPy-γ-ImPyPyPyPy
	301) 5'-W G T T A T W-3'	ImHpHpPyH _p -γ-PyH _p PyPyPy
	302) 5'-W G T T A A W-3'	ImHpHpPyPy-γ-HpH _p PyPyPy
10	303) 5'-W G T T A G W-3'	ImHpHpPyIm-γ-PyH _p PyPyPy
	304) 5'-W G T T A C W-3'	ImHpHpPyPy-γ-ImH _p PyPyPy
	305) 5'-W G T T G T W-3'	ImHpHpImH _p -γ-PyPyPyPyPy
	306) 5'-W G T T G A W-3'	ImHpHpImPy-γ-HpPyPyPyPy
	307) 5'-W G T T G G W-3'	ImHpHpImIm-γ-PyPyPyPyPy
15	308) 5'-W G T T G C W-3'	ImHpHpImPy-γ-ImPyPyPyPy
	309) 5'-W G T T C T W-3'	ImHpHpPyH _p -γ-PyImPyPyPy
	310) 5'-W G T T C A W-3'	ImHpHpPyPy-γ-HpImPyPyPy
	311) 5'-W G T T C G W-3'	ImHpHpPyIm-γ-PyImPyPyPy
	312) 5'-W G T T C C W-3'	ImHpHpPyPy-γ-ImImPyPyPy
20	313) 5'-W G T A T T W-3'	ImHpPyH _p H _p -γ-PyPyH _p PyPy
	314) 5'-W G T A T A W-3'	ImHpPyH _p Py-γ-HpPyH _p PyPy
	315) 5'-W G T A T G W-3'	ImHpPyH _p Im-γ-PyPyH _p PyPy
	316) 5'-W G T A T C W-3'	ImHpPyH _p Py-γ-ImPyH _p PyPy
	317) 5'-W G T A A T W-3'	ImHpPyH _p -γ-PyH _p H _p PyPy
25	318) 5'-W G T A A A W-3'	ImHpPyPyPy-γ-HpH _p H _p PyPy
	319) 5'-W G T A A G W-3'	ImHpPyPyIm-γ-PyH _p H _p PyPy
	320) 5'-W G T A A C W-3'	ImHpPyPyPy-γ-ImH _p H _p PyPy
	321) 5'-W G T A G T W-3'	ImHpPyImH _p -γ-PyPyH _p PyPy
	322) 5'-W G T A G A W-3'	ImHpPyImPy-γ-HpPyH _p PyPy
30	323) 5'-W G T A G G W-3'	ImHpPyImIm-γ-PyPyH _p PyPy
	324) 5'-W G T A G C W-3'	ImHpPyImPy-γ-ImPyH _p PyPy
	325) 5'-W G T A C T W-3'	ImHpPyPyH _p -γ-PyImH _p PyPy
	326) 5'-W G T A C A W-3'	ImHpPyPyPy-γ-HpImH _p PyPy
	327) 5'-W G T A C G W-3'	ImHpPyPyIm-γ-PyImH _p PyPy
35	328) 5'-W G T A C C W-3'	ImHpPyPyPy-γ-ImImH _p PyPy

TABLE 23: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
	329) 5'-W G T G T T W-3'	ImHpImHpH _p -γ-PyPyPyPyPy
5	330) 5'-W G T G T A W-3'	ImHpImHpPy-γ-HpPyPyPyPy
	331) 5'-W G T G T G W-3'	ImHpImHpIm-γ-PyPyPyPyPy
	332) 5'-W G T G T C W-3'	ImHpImHpPy-γ-ImPyPyPyPy
	333) 5'-W G T G A T W-3'	ImHpImPyH _p -γ-PyH _p PyPyPy
	334) 5'-W G T G A A W-3'	ImHpImPyPy-γ-HpH _p PyPyPy
10	335) 5'-W G T G A G W-3'	ImHpImPyIm-γ-PyH _p PyPyPy
	336) 5'-W G T G A C W-3'	ImHpImPyPy-γ-ImHpPyPyPy
	337) 5'-W G T G G T W-3'	ImHpImImH _p -γ-PyPyPyPyPy
	338) 5'-W G T G G A W-3'	ImHpImImPy-γ-HpPyPyPyPy
	339) 5'-W G T G C T W-3'	ImHpImPyH _p -γ-PyImPyPyPy
15	340) 5'-W G T G C A W-3'	ImHpImPyPy-γ-HpImPyPyPy
	341) 5'-W G T G G G W-3'	ImHpImImIm-γ-PyPyPyPyPy
	342) 5'-W G T G G C W-3'	ImHpImImPy-γ-ImPyPyPyPy
	343) 5'-W G T G C G W-3'	ImHpImPyIm-γ-PyImPyPyPy
	344) 5'-W G T G C C W-3'	ImHpImPyPy-γ-ImImPyPyPy
20	345) 5'-W G T C T T W-3'	ImH _p PyH _p H _p -γ-PyPyImPyPy
	346) 5'-W G T C T A W-3'	ImH _p PyH _p Py-γ-HpPyImPyPy
	347) 5'-W G T C T G W-3'	ImH _p PyH _p Im-γ-PyPyImPyPy
	348) 5'-W G T C T C W-3'	ImH _p PyH _p Py-γ-ImPyImPyPy
	349) 5'-W G T C A T W-3'	ImH _p PyH _p PyH _p -γ-PyH _p ImPyPy
25	350) 5'-W G T C A A W-3'	ImH _p PyPyPy-γ-HpH _p ImPyPy
	351) 5'-W G T C A G W-3'	ImH _p PyPyIm-γ-PyH _p ImPyPy
	352) 5'-W G T C A C W-3'	ImH _p PyPyPy-γ-ImH _p ImPyPy
	353) 5'-W G T C G T W-3'	ImH _p PyImH _p -γ-PyPyImPyPy
	354) 5'-W G T C G A W-3'	ImH _p PyImPy-γ-HpPyImPyPy
30	355) 5'-W G T C C T W-3'	ImH _p PyPyH _p -γ-PyImImPyPy
	356) 5'-W G T C C A W-3'	ImH _p PyPyPy-γ-HpImImPyPy
	357) 5'-W G T C G G W-3'	ImH _p PyImIm-γ-PyPyImPyPy
	358) 5'-W G T C G C W-3'	ImH _p PyImPy-γ-ImPyImPyPy
	359) 5'-W G T C C G W-3'	ImH _p PyPyIm-γ-PyImImPyPy
35	360) 5'-W G T C C C W-3'	ImH _p PyPyPy-γ-ImImImPyPy

TABLE 24: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGA_nW-3'

	DNA sequence	aromatic amino acid sequence
	361) 5'-W G A T T T W-3'	ImPyH _p H _p H _p -γ-PyPyPyH _p Py
5	362) 5'-W G A T T A W-3'	ImPyH _p H _p Py-γ-HpPyPyH _p Py
	363) 5'-W G A T T G W-3'	ImPyH _p H _p Im-γ-PyPyPyH _p Py
	364) 5'-W G A T T C W-3'	ImPyH _p H _p Py-γ-ImPyPyH _p Py
	365) 5'-W G A T A T W-3'	ImPyH _p PyH _p -γ-PyH _p PyH _p Py
	366) 5'-W G A T A A W-3'	ImPyH _p PyPy-γ-HpH _p PyH _p Py
10	367) 5'-W G A T A G W-3'	ImPyH _p PyIm-γ-PyH _p PyH _p Py
	368) 5'-W G A T A C W-3'	ImPyH _p PyPy-γ-ImH _p PyH _p Py
	369) 5'-W G A T G T W-3'	ImPyH _p ImH _p -γ-PyPyPyH _p Py
	370) 5'-W G A T G A W-3'	ImPyH _p ImPy-γ-HpPyPyH _p Py
	371) 5'-W G A T G G W-3'	ImPyH _p ImIm-γ-PyPyPyH _p Py
15	372) 5'-W G A T G C W-3'	ImPyH _p ImPy-γ-ImPyPyH _p Py
	373) 5'-W G A T C T W-3'	ImPyH _p PyH _p -γ-PyImPyH _p Py
	374) 5'-W G A T C A W-3'	ImPyH _p PyPy-γ-HpImPyH _p Py
	375) 5'-W G A T C G W-3'	ImPyH _p PyIm-γ-PyImPyH _p Py
	376) 5'-W G A T C C W-3'	ImPyH _p PyPy-γ-ImImPyH _p Py
20	377) 5'-W G A A T T W-3'	ImPyPyH _p H _p -γ-PyPyH _p H _p Py
	378) 5'-W G A A T A W-3'	ImPyPyH _p Py-γ-HpPyH _p H _p Py
	379) 5'-W G A A T G W-3'	ImPyPyH _p Im-γ-PyPyH _p H _p Py
	380) 5'-W G A A T C W-3'	ImPyPyH _p Py-γ-ImPyH _p H _p Py
	381) 5'-W G A A A T W-3'	ImPyPyH _p -γ-PyH _p H _p H _p Py
25	382) 5'-W G A A A A W-3'	ImPyPyPy-γ-HpH _p H _p H _p Py
	383) 5'-W G A A A G W-3'	ImPyPyPyIm-γ-PyH _p H _p H _p Py
	384) 5'-W G A A A C W-3'	ImPyPyPyPy-γ-ImH _p H _p H _p Py
	385) 5'-W G A A A G T W-3'	ImPyPyImH _p -γ-PyPyH _p H _p Py
	386) 5'-W G A A A G A W-3'	ImPyPyImPy-γ-HpPyH _p H _p Py
30	387) 5'-W G A A G G W-3'	ImPyPyImIm-γ-PyPyH _p H _p Py
	388) 5'-W G A A G C W-3'	ImPyPyImPy-γ-ImPyH _p H _p Py
	389) 5'-W G A A C T W-3'	ImPyPyPyH _p -γ-PyImH _p H _p Py
	390) 5'-W G A A C A W-3'	ImPyPyPyPy-γ-HpImH _p H _p Py
	391) 5'-W G A A C G W-3'	ImPyPyPyIm-γ-PyImH _p H _p Py
35	392) 5'-W G A A C C W-3'	ImPyPyPyPy-γ-ImImH _p H _p Py

TABLE 25: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	393) 5'-W G A G T T W-3'	ImPyImHpHp-γ-PyPyPyHpPy
	394) 5'-W G A G T A W-3'	ImPyImHpPy-γ-HpPyPyHpPy
	395) 5'-W G A G T G W-3'	ImPyImHpIm-γ-PyPyPyHpPy
	396) 5'-W G A G T C W-3'	ImPyImHpPy-γ-ImPyPyHpPy
	397) 5'-W G A G A T W-3'	ImPyImPyHp-γ-PyHpPyHpPy
10	398) 5'-W G A G A A W-3'	ImPyImPyPy-γ-HpHpPyHpPy
	399) 5'-W G A G A G W-3'	ImPyImPyIm-γ-PyHpPyHpPy
	400) 5'-W G A G A C W-3'	ImPyImPyPy-γ-ImHpPyHpPy
	401) 5'-W G A G G T W-3'	ImPyImImHp-γ-PyPyPyHpPy
	402) 5'-W G A G G A W-3'	ImPyImImPy-γ-HpPyPyHpPy
15	403) 5'-W G A G C T W-3'	ImPyImPyHp-γ-PyImPyHpPy
	404) 5'-W G A G C A W-3'	ImPyImPyPy-γ-HpImPyHpPy
	405) 5'-W G A G G G W-3'	ImPyImImIm-γ-PyPyPyHpPy
	406) 5'-W G A G G C W-3'	ImPyImImPy-γ-ImPyPyHpPy
	407) 5'-W G A G C G W-3'	ImPyImPyIm-γ-PyImPyHpPy
20	408) 5'-W G A G C C W-3'	ImPyImPyPy-γ-ImImPyHpPy
	409) 5'-W G A C T T W-3'	ImPyPyHpHp-γ-PyPyImHpPy
	410) 5'-W G A C T A W-3'	ImPyPyHpPy-γ-HpPyImHpPy
	411) 5'-W G A C T G W-3'	ImPyPyHpIm-γ-PyPyImHpPy
	412) 5'-W G A C T C W-3'	ImPyPyHpPy-γ-ImPyImHpPy
25	413) 5'-W G A C A T W-3'	ImPyPyPyHp-γ-PyHpImHpPy
	414) 5'-W G A C A A W-3'	ImPyPyPyPy-γ-HpHpImHpPy
	415) 5'-W G A C A G W-3'	ImPyPyPyIm-γ-PyHpImHpPy
	416) 5'-W G A C A C W-3'	ImPyPyPyPy-γ-ImHpImHpPy
	417) 5'-W G A C G T W-3'	ImPyPyImHp-γ-PyPyImHpPy
30	418) 5'-W G A C G A W-3'	ImPyPyImPy-γ-HpPyImHpPy
	419) 5'-W G A C C T W-3'	ImPyPyPyHp-γ-PyImImHpPy
	420) 5'-W G A C C A W-3'	ImPyPyPyPy-γ-HpImImHpPy
	421) 5'-W G A C G G W-3'	ImPyPyImIm-γ-PyPyImHpPy
	422) 5'-W G A C G C W-3'	ImPyPyImPy-γ-ImPyImHpPy
35	423) 5'-W G A C C G W-3'	ImPyPyPyIm-γ-PyImImHpPy
	424) 5'-W G A C C C W-3'	ImPyPyPyPy-γ-ImImImHpPy

TABLE 26: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCWNNW-3'

	DNA sequence	aromatic amino acid sequence
	425) 5'-W G C T T T W-3'	ImPyHpHpHp-γ-PyPyPyImPy
5	426) 5'-W G C T T A W-3'	ImPyHpHpPy-γ-HpPyPyImPy
	427) 5'-W G C T T G W-3'	ImPyHpHpIm-γ-PyPyPyImPy
	428) 5'-W G C T T C W-3'	ImPyHpHpPy-γ-ImPyPyImPy
	429) 5'-W G C T A T W-3'	ImPyHpPyHp-γ-PyHpPyImPy
	430) 5'-W G C T A A W-3'	ImPyHpPyPy-γ-HpHpPyImPy
10	431) 5'-W G C T A G W-3'	ImPyHpPyIm-γ-PyHpPyImPy
	432) 5'-W G C T A C W-3'	ImPyHpPyPy-γ-ImHpPyImPy
	433) 5'-W G C T G T W-3'	ImPyHpImHp-γ-PyPyPyImPy
	434) 5'-W G C T G A W-3'	ImPyHpImPy-γ-HpPyPyImPy
	435) 5'-W G C T G G W-3'	ImPyHpImIm-γ-PyPyPyImPy
15	436) 5'-W G C T G C W-3'	ImPyHpImPy-γ-ImPyPyImPy
	437) 5'-W G C T C T W-3'	ImPyHpPyHp-γ-PyImPyImPy
	438) 5'-W G C T C A W-3'	ImPyHpPyPy-γ-HpImPyImPy
	439) 5'-W G C T C G W-3'	ImPyHpIm-γ-PyImPyImPy
	440) 5'-W G C T C C W-3'	ImPyHpPyPy-γ-ImImPyImPy
20	441) 5'-W G C A T T W-3'	ImPyPyHpHp-γ-PyPyHpImPy
	442) 5'-W G C A T A W-3'	ImPyPyHpPy-γ-HpPyHpImPy
	443) 5'-W G C A T G W-3'	ImPyPyHpIm-γ-PyPyHpImPy
	444) 5'-W G C A T C W-3'	ImPyPyHpPy-γ-ImPyHpImPy
	445) 5'-W G C A A T W-3'	ImPyPyPyHp-γ-PyHpHpImPy
25	446) 5'-W G C A A A W-3'	ImPyPyPyPy-γ-HpHpHpImPy
	447) 5'-W G C A A G W-3'	ImPyPyPyIm-γ-PyHpHpImPy
	448) 5'-W G C A A C W-3'	ImPyPyPyPy-γ-ImHpHpImPy
	449) 5'-W G C A G T W-3'	ImPyPyImHp-γ-PyPyHpImPy
	450) 5'-W G C A G A W-3'	ImPyPyImPy-γ-HpPyHpImPy
30	451) 5'-W G C A G G W-3'	ImPyPyImIm-γ-PyPyHpImPy
	452) 5'-W G C A G C W-3'	ImPyPyImPy-γ-ImPyHpImPy
	453) 5'-W G C A C T W-3'	ImPyPyPyHp-γ-PyImHpImPy
	454) 5'-W G C A C A W-3'	ImPyPyPyPy-γ-HpImHpImPy
	455) 5'-W G C A C G W-3'	ImPyPyPyIm-γ-PyImHpImPy
35	456) 5'-W G C A C C W-3'	ImPyPyPyPy-γ-ImImHpImPy

TABLE 27: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
	457) 5'-W G C G T T W-3'	ImPyImHpHp-γ-PyPyPyImPy
5	458) 5'-W G C G T A W-3'	ImPyImHpPy-γ-HpPyPyImPy
	459) 5'-W G C G T G W-3'	ImPyImHpIm-γ-PyPyPyImPy
	460) 5'-W G C G T C W-3'	ImPyImHpPy-γ-ImPyPyImPy
	461) 5'-W G C G A T W-3'	ImPyImPyHp-γ-PyHpPyImPy
	462) 5'-W G C G A A W-3'	ImPyImPyPy-γ-HpHpPyImPy
10	463) 5'-W G C G A G W-3'	ImPyImPyIm-γ-PyHpPyImPy
	464) 5'-W G C G A C W-3'	ImPyImPyPy-γ-ImHpPyImPy
	465) 5'-W G C G G T W-3'	ImPyImImHp-γ-PyPyPyImPy
	466) 5'-W G C G G A W-3'	ImPyImImPy-γ-HpPyPyImPy
	467) 5'-W G C G C T W-3'	ImPyImPyHp-γ-PyImPyImPy
15	468) 5'-W G C G C A W-3'	ImPyImPyPy-γ-HpImPyImPy
	469) 5'-W G C C T T W-3'	ImPyPyHpHp-γ-PyPyImImPy
	470) 5'-W G C C T A W-3'	ImPyPyHpPy-γ-HpPyImImPy
	471) 5'-W G C C T G W-3'	ImPyPyHpIm-γ-PyPyImImPy
	472) 5'-W G C C T C W-3'	ImPyPyHpPy-γ-ImPyImImPy
20	473) 5'-W G C C A T W-3'	ImPyPyPyHp-γ-PyHpImImPy
	474) 5'-W G C C A A W-3'	ImPyPyPyPy-γ-HpHpImImPy
	475) 5'-W G C C A G W-3'	ImPyPyPyIm-γ-PyHpImImPy
	476) 5'-W G C C A C W-3'	ImPyPyPyPy-γ-ImHpImImPy
	477) 5'-W G C C G T W-3'	ImPyPyImHp-γ-PyPyImImPy
25	478) 5'-W G C C G A W-3'	ImPyPyImPy-γ-HpPyImImPy
	479) 5'-W G C C C T W-3'	ImPyPyPyHp-γ-PyImImImPy
	480) 5'-W G C C C A W-3'	ImPyPyPyPy-γ-HpImImImPy
	G25) 5'-W G C G G G W-3'	ImPyImImIm-γ-PyPyPyImPy
	G26) 5'-W G C G G C W-3'	ImPyImImPy-γ-ImPyPyImPy
30	G27) 5'-W G C G C G W-3'	ImPyImPyIm-γ-PyImPyImPy
	G28) 5'-W G C G C C W-3'	ImPyImPyPy-γ-ImImPyImPy
	G29) 5'-W G C C G G W-3'	ImPyPyImIm-γ-PyPyImImPy
	G30) 5'-W G C C G C W-3'	ImPyPyImPy-γ-ImPyImImPy
	G31) 5'-W G C C C G W-3'	ImPyPyPyIm-γ-PyImImImPy
35	G32) 5'-W G C C C C W-3'	ImPyPyPyPy-γ-ImImImImPy

TABLE 28: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGWNNW-3'

	DNA sequence	aromatic amino acid sequence
481)	5'-W C G T T T W-3'	PyImHpHpHp-γ-PyPyPyPyIm
5 482)	5'-W C G T T A W-3'	PyImHpHpPy-γ-HpPyPyPyIm
483)	5'-W C G T T G W-3'	PyImHpHpIm-γ-PyPyPyPyIm
484)	5'-W C G T T C W-3'	PyImHpHpPy-γ-ImPyPyPyIm
485)	5'-W C G T A T W-3'	PyImHpPyHp-γ-PyHpPyPyIm
486)	5'-W C G T A A W-3'	PyImHpPyPy-γ-HpHpPyPyIm
10 487)	5'-W C G T A G W-3'	PyImHpPyIm-γ-PyHpPyPyIm
488)	5'-W C G T A C W-3'	PyImHpPyPy-γ-ImHpPyPyIm
489)	5'-W C G T G T W-3'	PyImHpImHp-γ-PyPyPyPyIm
490)	5'-W C G T G A W-3'	PyImHpImPy-γ-HpPyPyPyIm
491)	5'-W C G T G G W-3'	PyImHpImIm-γ-PyPyPyPyIm
15 492)	5'-W C G T G C W-3'	PyImHpImPy-γ-ImPyPyPyIm
493)	5'-W C G T C T W-3'	PyImHpPyHp-γ-PyImPyPyIm
494)	5'-W C G T C A W-3'	PyImHpPyPy-γ-HpImPyPyIm
495)	5'-W C G T C G W-3'	PyImHpPyIm-γ-PyImPyPyIm
496)	5'-W C G T C C W-3'	PyImHpPyPy-γ-ImImPyPyIm
20 497)	5'-W C G A T T W-3'	PyImPyHpHp-γ-PyPyHpPyIm
498)	5'-W C G A T A W-3'	PyImPyHpPy-γ-HpPyHpPyIm
499)	5'-W C G A T G W-3'	PyImPyHpIm-γ-PyPyHpPyIm
500)	5'-W C G A T C W-3'	PyImPyHpPy-γ-ImPyHpPyIm
501)	5'-W C G A A T W-3'	PyImPyPyHp-γ-PyHpHpPyIm
25 502)	5'-W C G A A A W-3'	PyImPyPyPy-γ-HpHpHpPyIm
503)	5'-W C G A A G W-3'	PyImPyPyIm-γ-PyHpHpPyIm
504)	5'-W C G A A C W-3'	PyImPyPyPy-γ-ImHpHpPyIm
505)	5'-W C G A G T W-3'	PyImPyImHp-γ-PyPyHpPyIm
506)	5'-W C G A G A W-3'	PyImPyImPy-γ-HpPyHpPyIm
30 507)	5'-W C G A G G W-3'	PyImPyImIm-γ-PyPyHpPyIm
508)	5'-W C G A G C W-3'	PyImPyImPy-γ-ImPyHpPyIm
509)	5'-W C G A C T W-3'	PyImPyPyHp-γ-PyImHpPyIm
510)	5'-W C G A C A W-3'	PyImPyPyPy-γ-HpImHpPyIm
511)	5'-W C G A C G W-3'	PyImPyIm-γ-PyImHpPyIm
35 512)	5'-W C G A C C W-3'	PyImPyPyPy-γ-ImImHpPyIm

TABLE 29: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	513) 5'-W C G G T T W-3'	PyImImHpHp-γ-PyPyPyPyIm
	514) 5'-W C G G T A W-3'	PyImImHpPy-γ-HpPyPyPyIm
	515) 5'-W C G G T G W-3'	PyImImHpIm-γ-PyPyPyPyIm
	516) 5'-W C G G T C W-3'	PyImImHpPy-γ-ImPyPyPyIm
	517) 5'-W C G G A T W-3'	PyImImPyHp-γ-PyHpPyPyIm
	518) 5'-W C G G A A W-3'	PyImImPyPy-γ-HpHpPyPyIm
10	519) 5'-W C G G A G W-3'	PyImImPyIm-γ-PyHpPyPyIm
	520) 5'-W C G G A C W-3'	PyImImPyPy-γ-ImHpPyPyIm
	521) 5'-W C G G G T W-3'	PyImImImHp-γ-PyPyPyPyIm
	522) 5'-W C G G G A W-3'	PyImImImPy-γ-HpPyPyPyIm
	523) 5'-W C G G C T W-3'	PyImImPyHp-γ-PyImPyPyIm
15	524) 5'-W C G G C A W-3'	PyImImPyPy-γ-HpImPyPyIm
	525) 5'-W C G C T T W-3'	PyImPyHpHp-γ-PyPyImPyIm
	526) 5'-W C G C T A W-3'	PyImPyHpPy-γ-HpPyImPyIm
	527) 5'-W C G C T G W-3'	PyImPyHpIm-γ-PyPyImPyIm
	528) 5'-W C G C T C W-3'	PyImPyHpPy-γ-ImPyImPyIm
20	529) 5'-W C G C A T W-3'	PyImPyPyHp-γ-PyHpImPyIm
	530) 5'-W C G C A A W-3'	PyImPyPyPy-γ-HpHpImPyIm
	531) 5'-W C G C A G W-3'	PyImPyPyIm-γ-PyHpImPyIm
	532) 5'-W C G C A C W-3'	PyImPyPyPy-γ-ImHpImPyIm
	533) 5'-W C G C G T W-3'	PyImPyImHp-γ-PyPyImPyIm
25	534) 5'-W C G C G A W-3'	PyImPyImPy-γ-HpPyImPyIm
	535) 5'-W C G C C T W-3'	PyImPyPyHp-γ-PyImImPyIm
	536) 5'-W C G C C A W-3'	PyImPyPyPy-γ-HpImImPyIm
	G33) 5'-W C G G G G W-3'	PyImImImIm-γ-PyPyPyPyIm
	G34) 5'-W C G G G C W-3'	PyImImImPy-γ-ImPyPyPyIm
30	G35) 5'-W C G G C G W-3'	PyImImPyIm-γ-PyImPyPyIm
	G36) 5'-W C G G C C W-3'	PyImImPyPy-γ-ImImPyPyIm
	G37) 5'-W C G C G G W-3'	PyImPyImIm-γ-PyPyImPyIm
	G38) 5'-W C G C G C W-3'	PyImPyImPy-γ-ImPyImPyIm
	G39) 5'-W C G C C G W-3'	PyImPyPyIm-γ-PyImImPyIm
35	G40) 5'-W C G C C C W-3'	PyImPyPyPy-γ-ImImImPyIm

TABLE 30: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	5'-W C T T T T W-3'	PyHpHpHpPy-γ-PyPyPyPyIm
	538) 5'-W C T T T A W-3'	PyHpHpHpPy-γ-HpPyPyPyIm
	539) 5'-W C T T T G W-3'	PyHpHpHpIm-γ-PyPyPyPyIm
	540) 5'-W C T T T C W-3'	PyHpHpHpPy-γ-ImPyPyPyIm
	541) 5'-W C T T A T W-3'	PyHpHpPyHp-γ-PyHpPyPyIm
	542) 5'-W C T T A A W-3'	PyHpHpPyPy-γ-HpHpPyPyIm
10	543) 5'-W C T T A G W-3'	PyHpHpPyIm-γ-PyHpPyPyIm
	544) 5'-W C T T A C W-3'	PyHpHpPyPy-γ-ImHpPyPyIm
	545) 5'-W C T T G T W-3'	PyHpHpImHp-γ-PyPyPyPyIm
	546) 5'-W C T T G A W-3'	PyHpHpImPy-γ-HpPyPyPyIm
	547) 5'-W C T T G G W-3'	PyHpHpImIm-γ-PyPyPyPyIm
15	548) 5'-W C T T G C W-3'	PyHpHpImPy-γ-ImPyPyPyIm
	549) 5'-W C T T C T W-3'	PyHpHpPyHp-γ-PyImPyPyIm
	550) 5'-W C T T C A W-3'	PyHpHpPyPy-γ-HpImPyPyIm
	551) 5'-W C T T C G W-3'	PyHpHpPyIm-γ-PyImPyPyIm
	552) 5'-W C T T C C W-3'	PyHpHpPyPy-γ-ImImPyPyIm
20	553) 5'-W C T A T T W-3'	PyHpPyHpHp-γ-PyPyHppPyIm
	554) 5'-W C T A T A W-3'	PyHpPyHpPy-γ-HpPyHppPyIm
	555) 5'-W C T A T G W-3'	PyHpPyHpIm-γ-PyPyHppPyIm
	556) 5'-W C T A T C W-3'	PyHpPyHpPy-γ-ImPyHppPyIm
	557) 5'-W C T A A T W-3'	PyHpPyPyHp-γ-PyHppPyIm
25	558) 5'-W C T A A A W-3'	PyHpPyPyPy-γ-HpHppPyIm
	559) 5'-W C T A A G W-3'	PyHpPyPyIm-γ-PyHppPyIm
	560) 5'-W C T A A C W-3'	PyHpPyPyPy-γ-ImHppPyIm
	561) 5'-W C T A G T W-3'	PyHpPyImHp-γ-PyPyHppPyIm
	562) 5'-W C T A G A W-3'	PyHpPyImPy-γ-HpPyHppPyIm
30	563) 5'-W C T A G G W-3'	PyHpPyImIm-γ-PyPyHppPyIm
	564) 5'-W C T A G C W-3'	PyHpPyImPy-γ-ImPyHppPyIm
	565) 5'-W C T A C T W-3'	PyHpPyPyHp-γ-PyImHppPyIm
	566) 5'-W C T A C A W-3'	PyHpPyPyPy-γ-HpImHppPyIm
	567) 5'-W C T A C G W-3'	PyHpPyPyIm-γ-PyImHppPyIm
35	568) 5'-W C T A C C W-3'	PyHpPyPyPy-γ-ImImHppPyIm

TABLE 31: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	569) 5'-W C T G T T W-3'	PyHpImHpH _p -γ-PyPyPyPyIm
	570) 5'-W C T G T A W-3'	PyHpImHpPy-γ-HpPyPyPyIm
	571) 5'-W C T G T G W-3'	PyHpImHpIm-γ-PyPyPyPyIm
	572) 5'-W C T G T C W-3'	PyHpImHpPy-γ-ImPyPyPyIm
	573) 5'-W C T G A T W-3'	PyHpImPyH _p -γ-PyHpPyPyIm
	574) 5'-W C T G A A W-3'	PyHpImPyPy-γ-HpHpPyPyIm
10	575) 5'-W C T G A G W-3'	PyHpImPyIm-γ-PyHpPyPyIm
	576) 5'-W C T G A C W-3'	PyHpImPyPy-γ-ImHpPyPyIm
	577) 5'-W C T G G T W-3'	PyHpImImHp-γ-PyPyPyPyIm
	578) 5'-W C T G G A W-3'	PyHpImImPy-γ-HpPyPyPyIm
	579) 5'-W C T G C T W-3'	PyHpImPyH _p -γ-PyImPyPyIm
15	580) 5'-W C T G C A W-3'	PyHpImPyPy-γ-HpImPyPyIm
	581) 5'-W C T G G G W-3'	PyHpImImIm-γ-PyPyPyPyIm
	582) 5'-W C T G G C W-3'	PyHpImImPy-γ-ImPyPyPyIm
	583) 5'-W C T G C G W-3'	PyHpImPyIm-γ-PyImPyPyIm
	584) 5'-W C T G C C W-3'	PyHpImPyPy-γ-ImImPyPyIm
20	585) 5'-W C T C T T W-3'	PyHpPyH _p H _p -γ-PyPyImPyIm
	586) 5'-W C T C T A W-3'	PyHpPyH _p Py-γ-HpPyImPyIm
	587) 5'-W C T C T G W-3'	PyHpPyH _p Im-γ-PyPyImPyIm
	588) 5'-W C T C T C W-3'	PyHpPyH _p Py-γ-ImPyImPyIm
	589) 5'-W C T C A T W-3'	PyHpPyH _p -γ-PyH _p ImPyIm
25	590) 5'-W C T C A A W-3'	PyHpPyPyPy-γ-HpH _p ImPyIm
	591) 5'-W C T C A G W-3'	PyHpPyPyIm-γ-PyH _p ImPyIm
	592) 5'-W C T C A C W-3'	PyHpPyPyPy-γ-ImH _p ImPyIm
	593) 5'-W C T C G T W-3'	PyHpPyImH _p -γ-PyPyImPyIm
	594) 5'-W C T C G A W-3'	PyHpPyImPy-γ-HpPyImPyIm
30	595) 5'-W C T C C T W-3'	PyHpPyPyH _p -γ-PyImImPyIm
	596) 5'-W C T C C A W-3'	PyHpPyPyPy-γ-HpImImPyIm
	597) 5'-W C T C G G W-3'	PyHpPyImIm-γ-PyPyImPyIm
	598) 5'-W C T C G C W-3'	PyHpPyImPy-γ-ImPyImPyIm
	599) 5'-W C T C C G W-3'	PyHpPyPyIm-γ-PyImImPyIm
35	600) 5'-W C T C C C W-3'	PyHpPyPyPy-γ-ImImImPyIm

TABLE 32: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCAWNW-3'

	DNA sequence	aromatic amino acid sequence
5	601) 5'-W C A T T T W-3'	PyPyH _p H _p H _p -γ-PyPyH _p I _m
	602) 5'-W C A T T A W-3'	PyPyH _p H _p Py-γ-H _p PyH _p I _m
	603) 5'-W C A T T G W-3'	PyPyH _p H _p I _m -γ-PyPyH _p I _m
	604) 5'-W C A T T C W-3'	PyPyH _p H _p Py-γ-I _m PyH _p I _m
	605) 5'-W C A T A T W-3'	PyPyH _p PyH _p -γ-PyH _p PyH _p I _m
	606) 5'-W C A T A A W-3'	PyPyH _p PyPy-γ-H _p H _p PyH _p I _m
10	607) 5'-W C A T A G W-3'	PyPyH _p PyI _m -γ-PyH _p PyH _p I _m
	608) 5'-W C A T A C W-3'	PyPyH _p PyPy-γ-I _m H _p PyH _p I _m
	609) 5'-W C A T G T W-3'	PyPyH _p I _m H _p -γ-PyPyH _p I _m
	610) 5'-W C A T G A W-3'	PyPyH _p I _m Py-γ-H _p PyH _p I _m
	611) 5'-W C A T G G W-3'	PyPyH _p I _m I _m -γ-PyPyH _p I _m
15	612) 5'-W C A T G C W-3'	PyPyH _p I _m Py-γ-I _m PyH _p I _m
	613) 5'-W C A T C T W-3'	PyPyH _p PyH _p -γ-PyI _m PyH _p I _m
	614) 5'-W C A T C A W-3'	PyPyH _p PyPy-γ-H _p I _m PyH _p I _m
	615) 5'-W C A T C G W-3'	PyPyH _p PyI _m -γ-PyI _m PyH _p I _m
	616) 5'-W C A T C C W-3'	PyPyH _p PyPy-γ-I _m I _m PyH _p I _m
20	617) 5'-W C A A T T W-3'	PyPyPyH _p H _p -γ-PyPyH _p H _p I _m
	618) 5'-W C A A T A W-3'	PyPyPyH _p Py-γ-H _p PyH _p H _p I _m
	619) 5'-W C A A T G W-3'	PyPyPyH _p I _m -γ-PyPyH _p H _p I _m
	620) 5'-W C A A T C W-3'	PyPyPyH _p Py-γ-I _m PyH _p H _p I _m
	621) 5'-W C A A A T W-3'	PyPyPyPyH _p -γ-PyH _p H _p H _p I _m
25	622) 5'-W C A A A A W-3'	PyPyPyPyPy-γ-H _p H _p H _p H _p I _m
	623) 5'-W C A A A G W-3'	PyPyPyPyI _m -γ-PyH _p H _p H _p I _m
	624) 5'-W C A A A C W-3'	PyPyPyPyPy-γ-I _m H _p H _p H _p I _m
	625) 5'-W C A A A G T W-3'	PyPyPyI _m H _p -γ-PyPyH _p H _p I _m
	626) 5'-W C A A A G A W-3'	PyPyPyI _m Py-γ-H _p PyH _p H _p I _m
30	627) 5'-W C A A A G G W-3'	PyPyPyI _m I _m -γ-PyPyH _p H _p I _m
	628) 5'-W C A A A G C W-3'	PyPyPyI _m Py-γ-I _m PyH _p H _p I _m
	629) 5'-W C A A A C T W-3'	PyPyPyPyH _p -γ-PyI _m H _p H _p I _m
	630) 5'-W C A A A C A W-3'	PyPyPyPyPy-γ-H _p I _m H _p H _p I _m
	631) 5'-W C A A A C G W-3'	PyPyPyPyI _m -γ-PyI _m H _p H _p I _m
35	632) 5'-W C A A A C C W-3'	PyPyPyPyPy-γ-I _m I _m H _p H _p I _m

TABLE 33: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	633) 5'-W C A G T T W-3'	PyPyImHpHp-γ-PyPyPyHpIm
	634) 5'-W C A G T A W-3'	PyPyImHpPy-γ-HpPyPyHpIm
	635) 5'-W C A G T G W-3'	PyPyImHpIm-γ-PyPyPyHpIm
10	636) 5'-W C A G T C W-3'	PyPyImHpPy-γ-ImPyPyHpIm
	637) 5'-W C A G A T W-3'	PyPyImPyHp-γ-PyHpPyHpIm
	638) 5'-W C A G A A W-3'	PyPyImPyPy-γ-HpHpPyHpIm
15	639) 5'-W C A G A G W-3'	PyPyImPyIm-γ-PyHpPyHpIm
	640) 5'-W C A G A C W-3'	PyPyImPyPy-γ-ImHpPyHpIm
	641) 5'-W C A G G T W-3'	PyPyImImHp-γ-PyPyPyHpIm
	642) 5'-W C A G G A W-3'	PyPyImImPy-γ-HpPyPyHpIm
	643) 5'-W C A G C T W-3'	PyPyImPyHp-γ-PyImPyHpIm
20	644) 5'-W C A G C A W-3'	PyPyImPyPy-γ-HpImPyHpIm
	645) 5'-W C A G G G W-3'	PyPyImImIm-γ-PyPyPyHpIm
	646) 5'-W C A G G C W-3'	PyPyImImPy-γ-ImPyPyHpIm
	647) 5'-W C A G C G W-3'	PyPyImPyIm-γ-PyImPyHpIm
	648) 5'-W C A G C C W-3'	PyPyImPyPy-γ-ImImPyHpIm
25	649) 5'-W C A C T T W-3'	PyPyPyHpHp-γ-PyPyImHpIm
	650) 5'-W C A C T A W-3'	PyPyPyHpPy-γ-HpPyImHpIm
	651) 5'-W C A C T G W-3'	PyPyPyHpIm-γ-PyPyImHpIm
	652) 5'-W C A C T C W-3'	PyPyPyHpPy-γ-ImPyImHpIm
	653) 5'-W C A C A T W-3'	PyPyPyPyHp-γ-PyHpImHpIm
30	654) 5'-W C A C A A W-3'	PyPyPyPyPy-γ-HpHpImHpIm
	655) 5'-W C A C A G W-3'	PyPyPyPyIm-γ-PyHpImHpIm
	656) 5'-W C A C A C W-3'	PyPyPyPyPy-γ-ImHpImHpIm
	657) 5'-W C A C G T W-3'	PyPyPyImHp-γ-PyPyImHpIm
	658) 5'-W C A C G A W-3'	PyPyPyImPy-γ-HpPyImHpIm
35	659) 5'-W C A C C T W-3'	PyPyPyPyHp-γ-PyImImHpIm
	660) 5'-W C A C C A W-3'	PyPyPyPyPy-γ-HpImImHpIm
	661) 5'-W C A C G G W-3'	PyPyPyImIm-γ-PyPyImHpIm
	662) 5'-W C A C G C W-3'	PyPyPyImPy-γ-ImPyImHpIm
	663) 5'-W C A C C G W-3'	PyPyPyPyIm-γ-PyImImHpIm
	664) 5'-W C A C C C W-3'	PyPyPyPyPy-γ-ImImImHpIm

TABLE 34: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	665) 5'-W C C T T T W-3'	PyPyH _p H _p H _p -γ-PyPyPyImIm
	666) 5'-W C C T T A W-3'	PyPyH _p H _p Py-γ-HpPyPyImIm
	667) 5'-W C C T T G W-3'	PyPyH _p H _p Im-γ-PyPyPyImIm
	668) 5'-W C C T T C W-3'	PyPyH _p H _p Py-γ-ImPyPyImIm
	669) 5'-W C C T A T W-3'	PyPyH _p PyH _p -γ-PyH _p PyImIm
10	670) 5'-W C C T A A W-3'	PyPyH _p PyPy-γ-HpH _p PyImIm
	671) 5'-W C C T A G W-3'	PyPyH _p PyIm-γ-PyH _p PyImIm
	672) 5'-W C C T A C W-3'	PyPyH _p PyPy-γ-ImH _p PyImIm
	673) 5'-W C C T G T W-3'	PyPyH _p ImH _p -γ-PyPyPyImIm
	674) 5'-W C C T G A W-3'	PyPyH _p ImPy-γ-HpPyPyImIm
15	675) 5'-W C C T G G W-3'	PyPyH _p ImIm-γ-PyPyPyImIm
	676) 5'-W C C T G C W-3'	PyPyH _p ImPy-γ-ImPyPyImIm
	677) 5'-W C C T C T W-3'	PyPyH _p PyH _p -γ-PyImPyImIm
	678) 5'-W C C T C A W-3'	PyPyH _p PyPy-γ-HpImPyImIm
	679) 5'-W C C T C G W-3'	PyPyH _p PyIm-γ-PyImPyImIm
20	680) 5'-W C C T C C W-3'	PyPyH _p PyPy-γ-ImImPyImIm
	681) 5'-W C C A T T W-3'	PyPyPyH _p H _p -γ-PyPyH _p ImIm
	682) 5'-W C C A T A W-3'	PyPyPyH _p Py-γ-HpPyH _p ImIm
	683) 5'-W C C A T G W-3'	PyPyPyH _p Im-γ-PyPyH _p ImIm
	684) 5'-W C C A T C W-3'	PyPyPyH _p Py-γ-ImPyH _p ImIm
25	685) 5'-W C C A A T W-3'	PyPyPyH _p Py-γ-PyH _p H _p ImIm
	686) 5'-W C C A A A W-3'	PyPyPyPyPy-γ-HpH _p H _p ImIm
	687) 5'-W C C A A G W-3'	PyPyPyPyIm-γ-PyH _p H _p ImIm
	688) 5'-W C C A A C W-3'	PyPyPyPyPy-γ-ImH _p H _p ImIm
	689) 5'-W C C A G T W-3'	PyPyPyImH _p -γ-PyPyH _p ImIm
30	690) 5'-W C C A G A W-3'	PyPyPyImPy-γ-HpPyH _p ImIm
	691) 5'-W C C A G G W-3'	PyPyPyImIm-γ-PyPyH _p ImIm
	692) 5'-W C C A G C W-3'	PyPyPyImPy-γ-ImPyH _p ImIm
	693) 5'-W C C A C T W-3'	PyPyPyPyH _p -γ-PyImH _p ImIm
	694) 5'-W C C A C A W-3'	PyPyPyPyPy-γ-HpImH _p ImIm
35	695) 5'-W C C A C G W-3'	PyPyPyPyIm-γ-PyImH _p ImIm
	696) 5'-W C C A C C W-3'	PyPyPyPyPy-γ-ImImH _p ImIm

TABLE 35: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCSNW-3'

	DNA sequence	aromatic amino acid sequence
	697) 5'-W C C G T T W-3'	PyPyImHpH _p -γ-PyPyPyImIm
5	698) 5'-W C C G T A W-3'	PyPyImHpPy-γ-HpPyPyImIm
	699) 5'-W C C G T G W-3'	PyPyImHpIm-γ-PyPyPyImIm
	700) 5'-W C C G T C W-3'	PyPyImHpPy-γ-ImPyPyImIm
	701) 5'-W C C G A T W-3'	PyPyImPyH _p -γ-PyH _p PyImIm
	702) 5'-W C C G A A W-3'	PyPyImPyPy-γ-HpH _p PyImIm
10	703) 5'-W C C G A G W-3'	PyPyImPyIm-γ-PyH _p PyImIm
	704) 5'-W C C G A C W-3'	PyPyImPyPy-γ-ImH _p PyImIm
	705) 5'-W C C G G T W-3'	PyPyImImH _p -γ-PyPyPyImIm
	706) 5'-W C C G G A W-3'	PyPyImImPy-γ-HpPyPyImIm
	707) 5'-W C C G C T W-3'	PyPyImPyH _p -γ-PyImPyImIm
15	708) 5'-W C C G C A W-3'	PyPyImPyPy-γ-HpImPyImIm
	709) 5'-W C C C T T W-3'	PyPyPyH _p H _p -γ-PyPyImImIm
	710) 5'-W C C C T A W-3'	PyPyPyH _p Py-γ-HpPyImImIm
	711) 5'-W C C C T G W-3'	PyPyPyH _p Im-γ-PyPyImImIm
	712) 5'-W C C C T C W-3'	PyPyPyH _p Py-γ-ImPyImImIm
20	713) 5'-W C C C A T W-3'	PyPyPyPyH _p -γ-PyH _p ImImIm
	714) 5'-W C C C A A W-3'	PyPyPyPyPy-γ-HpH _p ImImIm
	715) 5'-W C C C A G W-3'	PyPyPyPyIm-γ-PyH _p ImImIm
	716) 5'-W C C C A C W-3'	PyPyPyPyPy-γ-ImH _p ImImIm
	717) 5'-W C C C G T W-3'	PyPyPyImH _p -γ-PyPyImImIm
25	718) 5'-W C C C G A W-3'	PyPyPyImPy-γ-HpPyImImIm
	719) 5'-W C C C C T W-3'	PyPyPyPyH _p -γ-PyImImImIm
	720) 5'-W C C C C A W-3'	PyPyPyPyPy-γ-HpImImImIm
	G41) 5'-W C C G G G W-3'	PyPyImImIm-γ-PyPyPyImIm
	G42) 5'-W C C G G C W-3'	PyPyImImPy-γ-ImPyPyImIm
30	G43) 5'-W C C G C G W-3'	PyPyImPyIm-γ-PyImPyImIm
	G44) 5'-W C C G C C W-3'	PyPyImPyPy-γ-ImImPyImIm
	G45) 5'-W C C C G G W-3'	PyPyPyImIm-γ-PyPyImImIm
	G46) 5'-W C C C G C W-3'	PyPyPyImPy-γ-ImPyImImIm
	G47) 5'-W C C C C G W-3'	PyPyPyPyIm-γ-PyImImImIm
35	G48) 5'-W C C C C C W-3'	PyPyPyPyPy-γ-ImImImImIm

TABLE 36: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	721) 5'-W A G T T T W-3'	PyImHpHpH _p -γ-PyPyPyPyH _p
5	722) 5'-W A G T T A W-3'	PyImHpHpPy-γ-HpPyPyPyH _p
	723) 5'-W A G T T G W-3'	PyImHpHpIm-γ-PyPyPyPyH _p
	724) 5'-W A G T T C W-3'	PyImHpHpPy-γ-ImPyPyPyH _p
	725) 5'-W A G T A T W-3'	PyImHpPyH _p -γ-PyH _p PyPyH _p
	726) 5'-W A G T A A W-3'	PyImHpPyPy-γ-HpH _p PyPyH _p
10	727) 5'-W A G T A G W-3'	PyImHpPyIm-γ-PyH _p PyPyH _p
	728) 5'-W A G T A C W-3'	PyImHpPyPy-γ-ImH _p PyPyH _p
	729) 5'-W A G T G T W-3'	PyImHpImH _p -γ-PyPyPyPyH _p
	730) 5'-W A G T G A W-3'	PyImHpImPy-γ-HpPyPyPyH _p
	731) 5'-W A G T G G W-3'	PyImHpImIm-γ-PyPyPyPyH _p
15	732) 5'-W A G T G C W-3'	PyImHpImPy-γ-ImPyPyPyH _p
	733) 5'-W A G T C T W-3'	PyImHpPyH _p -γ-PyImPyPyH _p
	734) 5'-W A G T C A W-3'	PyImHpPyPy-γ-HpImPyPyH _p
	735) 5'-W A G T C G W-3'	PyImHpPyIm-γ-PyImPyPyH _p
	736) 5'-W A G T C C W-3'	PyImHpPyPy-γ-ImImPyPyH _p
20	737) 5'-W A G A T T W-3'	PyImPyH _p H _p -γ-PyPyH _p PyH _p
	738) 5'-W A G A T A W-3'	PyImPyH _p Py-γ-HpPyH _p PyH _p
	739) 5'-W A G A T G W-3'	PyImPyH _p Im-γ-PyPyH _p PyH _p
	740) 5'-W A G A T C W-3'	PyImPyH _p Py-γ-ImPyH _p PyH _p
	741) 5'-W A G A A T W-3'	PyImPyH _p Py-γ-PyH _p H _p PyH _p
25	742) 5'-W A G A A A W-3'	PyImPyPyPy-γ-HpH _p H _p PyH _p
	743) 5'-W A G A A G W-3'	PyImPyPyIm-γ-PyH _p H _p PyH _p
	744) 5'-W A G A A C W-3'	PyImPyPyPy-γ-ImH _p H _p PyH _p
	745) 5'-W A G A G T W-3'	PyImPyImH _p -γ-PyPyH _p PyH _p
	746) 5'-W A G A G A W-3'	PyImPyImPy-γ-HpPyH _p PyH _p
30	747) 5'-W A G A G G W-3'	PyImPyImIm-γ-PyPyH _p PyH _p
	748) 5'-W A G A G C W-3'	PyImPyImPy-γ-ImPyH _p PyH _p
	749) 5'-W A G A C T W-3'	PyImPyPyH _p -γ-PyImH _p PyH _p
	750) 5'-W A G A C A W-3'	PyImPyPyPy-γ-HpImH _p PyH _p
	751) 5'-W A G A C G W-3'	PyImPyPyIm-γ-PyImH _p PyH _p
35	752) 5'-W A G A C C W-3'	PyImPyPyPy-γ-ImImH _p PyH _p

TABLE 37: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	753) 5'-W A G G T T W-3'	PyImImHpHp- γ -PyPyPyPyHp
	754) 5'-W A G G T A W-3'	PyImImHpPy- γ -HpPyPyPyHp
	755) 5'-W A G G T G W-3'	PyImImHpIm- γ -PyPyPyPyHp
	756) 5'-W A G G T C W-3'	PyImImHpPy- γ -ImPyPyPyHp
	757) 5'-W A G G A T W-3'	PyImImPyHp- γ -PyHpPyPyHp
	758) 5'-W A G G A A W-3'	PyImImPyPy- γ -HpHpPyPyHp
10	759) 5'-W A G G A G W-3'	PyImImPyIm- γ -PyHpPyPyHp
	760) 5'-W A G G A C W-3'	PyImImPyPy- γ -ImHpPyPyHp
	761) 5'-W A G G G T W-3'	PyImImImHp- γ -PyPyPyPyHp
	762) 5'-W A G G G A W-3'	PyImImImPy- γ -HpPyPyPyHp
	763) 5'-W A G G C T W-3'	PyImImPyHp- γ -PyImPyPyHp
15	764) 5'-W A G G C A W-3'	PyImImPyPy- γ -HpImPyPyHp
	765) 5'-W A G C T T W-3'	PyImPyHpHp- γ -PyPyImPyHp
	766) 5'-W A G C T A W-3'	PyImPyHpPy- γ -HpPyImPyHp
	767) 5'-W A G C T G W-3'	PyImPyHpIm- γ -PyPyImPyHp
	768) 5'-W A G C T C W-3'	PyImPyHpPy- γ -ImPyImPyHp
20	769) 5'-W A G C A T W-3'	PyImPyPyHp- γ -PyHpImPyHp
	770) 5'-W A G C A A W-3'	PyImPyPyPy- γ -HpHpImPyHp
	771) 5'-W A G C A G W-3'	PyImPyPyIm- γ -PyHpImPyHp
	772) 5'-W A G C A C W-3'	PyImPyPyPy- γ -ImHpImPyHp
	773) 5'-W A G C G T W-3'	PyImPyImHp- γ -PyPyImPyHp
25	774) 5'-W A G C G A W-3'	PyImPyImPy- γ -HpPyImPyHp
	775) 5'-W A G C C T W-3'	PyImPyPyHp- γ -PyImImPyHp
	776) 5'-W A G C C A W-3'	PyImPyPyPy- γ -HpImImPyHp
	777) 5'-W A G G G G W-3'	PyImImImIm- γ -PyPyPyPyHp
	778) 5'-W A G G G C W-3'	PyImImImPy- γ -ImPyPyPyHp
30	779) 5'-W A G G C G W-3'	PyImImPyIm- γ -PyImPyPyHp
	780) 5'-W A G G C C W-3'	PyImImPyPy- γ -ImImPyPyHp
	781) 5'-W A G C G G W-3'	PyImPyImIm- γ -PyPyImPyHp
	782) 5'-W A G C G C W-3'	PyImPyImPy- γ -ImPyImPyHp
	783) 5'-W A G C C G W-3'	PyImPyPyIm- γ -PyImImPyHp
35	784) 5'-W A G C C C W-3'	PyImPyPyPy- γ -ImImImPyHp

TABLE 38: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATWNNW-3'

	DNA sequence	aromatic amino acid sequence
	785) 5'-W A T T T T W-3'	PyHpHpHpHp-γ-PyPyPyPyHp
5	786) 5'-W A T T T A W-3'	PyHpHpHpPy-γ-HpPyPyPyHp
	787) 5'-W A T T T G W-3'	PyHpHpHpIm-γ-PyPyPyPyHp
	788) 5'-W A T T T C W-3'	PyHpHpHpPy-γ-ImPyPyPyHp
	789) 5'-W A T T A T W-3'	PyHpHpPyHp-γ-PyHpPyPyHp
	790) 5'-W A T T A A W-3'	PyHpHpPyPy-γ-HpHpPyPyHp
10	791) 5'-W A T T A G W-3'	PyHpHpPyIm-γ-PyHpPyPyHp
	792) 5'-W A T T A C W-3'	PyHpHpPyPy-γ-ImHpPyPyHp
	793) 5'-W A T T G T W-3'	PyHpHpImHp-γ-PyPyPyPyHp
	794) 5'-W A T T G A W-3'	PyHpHpImPy-γ-HpPyPyPyHp
	795) 5'-W A T T G G W-3'	PyHpHpImIm-γ-PyPyPyPyHp
15	796) 5'-W A T T G C W-3'	PyHpHpImPy-γ-ImPyPyPyHp
	797) 5'-W A T T C T W-3'	PyHpHpPyHp-γ-PyImPyPyHp
	798) 5'-W A T T C A W-3'	PyHpHpPyPy-γ-HpImPyPyHp
	799) 5'-W A T T C G W-3'	PyHpHpPyIm-γ-PyImPyPyHp
	800) 5'-W A T T C C W-3'	PyHpHpPyPy-γ-ImImPyPyHp
20	801) 5'-W A T A T T W-3'	PyHpPyHpHp-γ-PyPyHpPyHp
	802) 5'-W A T A T A W-3'	PyHpPyHpPy-γ-HpPyHpPyHp
	803) 5'-W A T A T G W-3'	PyHpPyHpIm-γ-PyPyHpPyHp
	804) 5'-W A T A T C W-3'	PyHpPyHpPy-γ-ImPyHpPyHp
	805) 5'-W A T A A T W-3'	PyHpPyPyHp-γ-PyHpHpPyHp
25	806) 5'-W A T A A A W-3'	PyHpPyPyPy-γ-HpHpHpPyHp
	807) 5'-W A T A A G W-3'	PyHpPyPyIm-γ-PyHpHpPyHp
	808) 5'-W A T A A C W-3'	PyHpPyPyPy-γ-ImHpHpPyHp
	809) 5'-W A T A G T W-3'	PyHpPyImHp-γ-PyPyHpPyHp
	810) 5'-W A T A G A W-3'	PyHpPyImPy-γ-HpPyHpPyHp
30	811) 5'-W A T A G G W-3'	PyHpPyImIm-γ-PyPyHpPyHp
	812) 5'-W A T A G C W-3'	PyHpPyImPy-γ-ImPyHpPyHp
	813) 5'-W A T A C T W-3'	PyHpPyPyHp-γ-PyImHpPyHp
	814) 5'-W A T A C A W-3'	PyHpPyPyPy-γ-HpImHpPyHp
	815) 5'-W A T A C G W-3'	PyHpPyPyIm-γ-PyImHpPyHp
35	816) 5'-W A T A C C W-3'	PyHpPyPyPy-γ-ImImHpPyHp

TABLE 39: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	817) 5'-W A T G T T W-3'	PyHpImHpHp-γ-PyPyPyPyHp
	818) 5'-W A T G T A W-3'	PyHpImHpPy-γ-HpPyPyPyHp
	819) 5'-W A T G T G W-3'	PyHpImHpIm-γ-PyPyPyPyHp
	820) 5'-W A T G T C W-3'	PyHpImHpPy-γ-ImPyPyPyHp
	821) 5'-W A T G A T W-3'	PyHpImPyHp-γ-PyHpPyPyHp
	822) 5'-W A T G A A W-3'	PyHpImPyPy-γ-HpHpPyPyHp
10	823) 5'-W A T G A G W-3'	PyHpImPyIm-γ-PyHpPyPyHp
	824) 5'-W A T G A C W-3'	PyHpImPyPy-γ-ImHpPyPyHp
	825) 5'-W A T G G T W-3'	PyHpImImHp-γ-PyPyPyPyHp
	826) 5'-W A T G G A W-3'	PyHpImImPy-γ-HpPyPyPyHp
	827) 5'-W A T G C T W-3'	PyHpImPyHp-γ-PyImPyPyHp
15	828) 5'-W A T G C A W-3'	PyHpImPyPy-γ-HpImPyPyHp
	829) 5'-W A T G G G W-3'	PyHpImImIm-γ-PyPyPyPyHp
	830) 5'-W A T G G C W-3'	PyHpImImPy-γ-ImPyPyPyHp
	831) 5'-W A T G C G W-3'	PyHpImPyIm-γ-PyImPyPyHp
	832) 5'-W A T G C C W-3'	PyHpImPyPy-γ-ImImPyPyHp
20	833) 5'-W A T C T T W-3'	PyHpPyHpHp-γ-PyPyImPyHp
	834) 5'-W A T C T A W-3'	PyHpPyHpPy-γ-HpPyImPyHp
	835) 5'-W A T C T G W-3'	PyHpPyHpIm-γ-PyPyImPyHp
	836) 5'-W A T C T C W-3'	PyHpPyHpPy-γ-ImPyImPyHp
	837) 5'-W A T C A T W-3'	PyHpPyPyHp-γ-PyHpImPyHp
25	838) 5'-W A T C A A W-3'	PyHpPyPyPy-γ-HpHpImPyHp
	839) 5'-W A T C A G W-3'	PyHpPyPyIm-γ-PyHpImPyHp
	840) 5'-W A T C A C W-3'	PyHpPyPyPy-γ-ImHpImPyHp
	841) 5'-W A T C G T W-3'	PyHpPyImHp-γ-PyPyImPyHp
	842) 5'-W A T C G A W-3'	PyHpPyImPy-γ-HpPyImPyHp
30	843) 5'-W A T C C T W-3'	PyHpPyPyHp-γ-PyImImPyHp
	844) 5'-W A T C C A W-3'	PyHpPyPyPy-γ-HpImImPyHp
	845) 5'-W A T C G G W-3'	PyHpPyImIm-γ-PyPyImPyHp
	846) 5'-W A T C G C W-3'	PyHpPyImPy-γ-ImPyImPyHp
	847) 5'-W A T C C G W-3'	PyHpPyPyIm-γ-PyImImPyHp
35	848) 5'-W A T C C C W-3'	PyHpPyPyPy-γ-ImImImPyHp

TABLE 40: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAAWNNW-3'

	DNA sequence	aromatic amino acid sequence
	849) 5'-W A A T T T W-3'	PyPyHpHpHp-γ-PyPyPyHpHp
5	850) 5'-W A A T T A W-3'	PyPyHpHpPy-γ-HpPyPyHpHp
	851) 5'-W A A T T G W-3'	PyPyHpHpIm-γ-PyPyPyHpHp
	852) 5'-W A A T T C W-3'	PyPyHpHpPy-γ-ImPyPyHpHp
	853) 5'-W A A T A T W-3'	PyPyHpPyHp-γ-PyHpPyHpHp
	854) 5'-W A A T A A W-3'	PyPyHpPyPy-γ-HpHpPyHpHp
10	855) 5'-W A A T A G W-3'	PyPyHpPyIm-γ-PyHpPyHpHp
	856) 5'-W A A T A C W-3'	PyPyHpPyPy-γ-ImHpPyHpHp
	857) 5'-W A A T G T W-3'	PyPyHpImHp-γ-PyPyPyHpHp
	858) 5'-W A A T G A W-3'	PyPyHpImPy-γ-HpPyPyHpHp
	859) 5'-W A A T G G W-3'	PyPyHpImIm-γ-PyPyPyHpHp
15	860) 5'-W A A T G C W-3'	PyPyHpImPy-γ-ImPyPyHpHp
	861) 5'-W A A T C T W-3'	PyPyHpPyHp-γ-PyImPyHpHp
	862) 5'-W A A T C A W-3'	PyPyHpPyPy-γ-HpImPyHpHp
	863) 5'-W A A T C G W-3'	PyPyHpPyIm-γ-PyImPyHpHp
	864) 5'-W A A T C C W-3'	PyPyHpPyPy-γ-ImImPyHpHp
20	865) 5'-W A A A T T W-3'	PyPyPyHpHp-γ-PyPyHpHpHp
	866) 5'-W A A A T A W-3'	PyPyPyHpPy-γ-HpPyHpHpHp
	867) 5'-W A A A T G W-3'	PyPyPyHpIm-γ-PyPyHpHpHp
	868) 5'-W A A A T C W-3'	PyPyPyHpPy-γ-ImPyHpHpHp
	869) 5'-W A A A A T W-3'	PyPyPyPyHp-γ-PyHpHpHpHp
25	870) 5'-W A A A A A W-3'	PyPyPyPyPy-γ-HpHpHpHpHp
	871) 5'-W A A A A G W-3'	PyPyPyPyIm-γ-PyHpHpHpHp
	872) 5'-W A A A A C W-3'	PyPyPyPyPy-γ-ImHpHpHpHp
	873) 5'-W A A A A G T W-3'	PyPyPyPyImHp-γ-PyPyHpHpHp
	874) 5'-W A A A A G A W-3'	PyPyPyPyImPy-γ-HpPyHpHpHp
30	875) 5'-W A A A A G G W-3'	PyPyPyImIm-γ-PyPyHpHpHp
	876) 5'-W A A A A G C W-3'	PyPyPyImPy-γ-ImPyHpHpHp
	877) 5'-W A A A A C T W-3'	PyPyPyPyHp-γ-PyImHpHpHp
	878) 5'-W A A A A C A W-3'	PyPyPyPyPy-γ-HpImHpHpHp
	879) 5'-W A A A A C G W-3'	PyPyPyPyIm-γ-PyImHpHpHp
35	880) 5'-W A A A A C C W-3'	PyPyPyPyPy-γ-ImImHpHpHp

TABLE 41: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	881) 5'-W A A G T T W-3'	PyPyImHpHp-γ-PyPyPyHpHp
	882) 5'-W A A G T A W-3'	PyPyImHpPy-γ-HpPyPyHpHp
	883) 5'-W A A G T G W-3'	PyPyImHpIm-γ-PyPyPyHpHp
10	884) 5'-W A A G T C W-3'	PyPyImHpPy-γ-ImPyPyHpHp
	885) 5'-W A A G A T W-3'	PyPyImPyHp-γ-PyHpPyHpHp
	886) 5'-W A A G A A W-3'	PyPyImPyPy-γ-HpHpPyHpHp
15	887) 5'-W A A G A G W-3'	PyPyImPyIm-γ-PyHpPyHpHp
	888) 5'-W A A G A C W-3'	PyPyImPyPy-γ-ImHpPyHpHp
	889) 5'-W A A G G T W-3'	PyPyImImHp-γ-PyPyPyHpHp
	890) 5'-W A A G G A W-3'	PyPyImImPy-γ-HpPyPyHpHp
20	891) 5'-W A A G C T W-3'	PyPyImPyHp-γ-PyImPyHpHp
	892) 5'-W A A G C A W-3'	PyPyImPyPy-γ-HpImPyHpHp
	893) 5'-W A A G G G W-3'	PyPyImImIm-γ-PyPyPyHpHp
	894) 5'-W A A G G C W-3'	PyPyImImPy-γ-ImPyPyHpHp
	895) 5'-W A A G C G W-3'	PyPyImPyIm-γ-PyImPyHpHp
25	896) 5'-W A A G C C W-3'	PyPyImPyPy-γ-ImImPyHpHp
	897) 5'-W A A C T T W-3'	PyPyPyHpHp-γ-PyPyImHpHp
	898) 5'-W A A C T A W-3'	PyPyPyHpPy-γ-HpPyImHpHp
	899) 5'-W A A C T G W-3'	PyPyPyHpIm-γ-PyPyImHpHp
	900) 5'-W A A C T C W-3'	PyPyPyHpPy-γ-ImPyImHpHp
30	901) 5'-W A A C A T W-3'	PyPyPyPyHp-γ-PyHpImHpHp
	902) 5'-W A A C A A W-3'	PyPyPyPyPy-γ-HpHpImHpHp
	903) 5'-W A A C A G W-3'	PyPyPyPyIm-γ-PyHpImHpHp
	904) 5'-W A A C A C W-3'	PyPyPyPyPy-γ-ImHpImHpHp
	905) 5'-W A A C G T W-3'	PyPyPyImHp-γ-PyPyImHpHp
	906) 5'-W A A C G A W-3'	PyPyPyImPy-γ-HpPyImHpHp
35	907) 5'-W A A C C T W-3'	PyPyPyPyHp-γ-PyImImHpHp
	908) 5'-W A A C C A W-3'	PyPyPyPyPy-γ-HpImImHpHp
	909) 5'-W A A C G G W-3'	PyPyPyImIm-γ-PyPyImHpHp
	910) 5'-W A A C G C W-3'	PyPyPyImPy-γ-ImPyImHpHp
	911) 5'-W A A C C G W-3'	PyPyPyIm-γ-PyImImHpHp
	912) 5'-W A A C C C W-3'	PyPyPyPyPy-γ-ImImImHpHp

TABLE 42: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	913) 5'-W A C T T T W-3'	PyPyH _p H _p H _p -γ-PyPyPyImH _p
	914) 5'-W A C T T A W-3'	PyPyH _p H _p Py-γ-HpPyPyImH _p
	915) 5'-W A C T T G W-3'	PyPyH _p H _p Im-γ-PyPyPyImH _p
	916) 5'-W A C T T C W-3'	PyPyH _p H _p Py-γ-ImPyPyImH _p
	917) 5'-W A C T A T W-3'	PyPyH _p PyH _p -γ-PyH _p PyImH _p
	918) 5'-W A C T A A W-3'	PyPyH _p PyPy-γ-HpH _p PyImH _p
10	919) 5'-W A C T A G W-3'	PyPyH _p PyIm-γ-PyH _p PyImH _p
	920) 5'-W A C T A C W-3'	PyPyH _p PyPy-γ-ImH _p PyImH _p
	921) 5'-W A C T G T W-3'	PyPyH _p ImH _p -γ-PyPyPyImH _p
	922) 5'-W A C T G A W-3'	PyPyH _p ImPy-γ-HpPyPyImH _p
	923) 5'-W A C T G G W-3'	PyPyH _p ImIm-γ-PyPyPyImH _p
15	924) 5'-W A C T G C W-3'	PyPyH _p ImPy-γ-ImPyPyImH _p
	925) 5'-W A C T C T W-3'	PyPyH _p PyH _p -γ-PyImPyImH _p
	926) 5'-W A C T C A W-3'	PyPyH _p PyPy-γ-HpImPyImH _p
	927) 5'-W A C T C G W-3'	PyPyH _p PyIm-γ-PyImPyImH _p
	928) 5'-W A C T C C W-3'	PyPyH _p PyPy-γ-ImImPyImH _p
20	929) 5'-W A C A T T W-3'	PyPyPyH _p H _p -γ-PyPyH _p ImH _p
	930) 5'-W A C A T A W-3'	PyPyPyH _p Py-γ-HpPyH _p ImH _p
	931) 5'-W A C A T G W-3'	PyPyPyH _p Im-γ-PyPyH _p ImH _p
	932) 5'-W A C A T C W-3'	PyPyPyH _p Py-γ-ImPyH _p ImH _p
	933) 5'-W A C A A T W-3'	PyPyPyPyH _p -γ-PyH _p H _p ImH _p
25	934) 5'-W A C A A A W-3'	PyPyPyPyPy-γ-HpH _p H _p ImH _p
	935) 5'-W A C A A G W-3'	PyPyPyPyIm-γ-PyH _p H _p ImH _p
	936) 5'-W A C A A C W-3'	PyPyPyPyPy-γ-ImH _p H _p ImH _p
	937) 5'-W A C A G T W-3'	PyPyPyPyImH _p -γ-PyPyH _p ImH _p
	938) 5'-W A C A G A W-3'	PyPyPyPyImPy-γ-HpPyH _p ImH _p
30	939) 5'-W A C A G G W-3'	PyPyPyImIm-γ-PyPyH _p ImH _p
	940) 5'-W A C A G C W-3'	PyPyPyImPy-γ-ImPyH _p ImH _p
	941) 5'-W A C A C T W-3'	PyPyPyPyH _p -γ-PyImH _p ImH _p
	942) 5'-W A C A C A W-3'	PyPyPyPyPy-γ-HpImH _p ImH _p
	943) 5'-W A C A C G W-3'	PyPyPyPyIm-γ-PyImH _p ImH _p
35	944) 5'-W A C A C C W-3'	PyPyPyPyPy-γ-ImImH _p ImH _p

TABLE 43: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACSNNW-3'

	DNA sequence	aromatic amino acid sequence
	945) 5'-W A C G T T W-3'	PyPyImHpH _p -γ-PyPyPyImHp
5	946) 5'-W A C G T A W-3'	PyPyImHpPy-γ-HpPyPyImHp
	947) 5'-W A C G T G W-3'	PyPyImHpIm-γ-PyPyPyImHp
	948) 5'-W A C G T C W-3'	PyPyImHpPy-γ-ImPyPyImHp
	949) 5'-W A C G A T W-3'	PyPyImPyH _p -γ-PyH _p PyImHp
	950) 5'-W A C G A A W-3'	PyPyImPyPy-γ-HpH _p PyImHp
10	951) 5'-W A C G A G W-3'	PyPyImPyIm-γ-PyH _p PyImHp
	952) 5'-W A C G A C W-3'	PyPyImPyPy-γ-ImHpPyImHp
	953) 5'-W A C G G T W-3'	PyPyImImHp-γ-PyPyPyImHp
	954) 5'-W A C G G A W-3'	PyPyImImPy-γ-HpPyPyImHp
	955) 5'-W A C G C T W-3'	PyPyImPyH _p -γ-PyImPyImHp
15	956) 5'-W A C G C A W-3'	PyPyImPyPy-γ-HpImPyImHp
	957) 5'-W A C C T T W-3'	PyPyPyH _p H _p -γ-PyPyImImHp
	958) 5'-W A C C T A W-3'	PyPyPyH _p Py-γ-HpPyImImHp
	959) 5'-W A C C T G W-3'	PyPyPyH _p Im-γ-PyPyImImHp
	960) 5'-W A C C T C W-3'	PyPyPyH _p Py-γ-ImPyImImHp
20	961) 5'-W A C C A T W-3'	PyPyPyPyH _p -γ-PyH _p ImImHp
	962) 5'-W A C C A A W-3'	PyPyPyPyPy-γ-HpH _p ImImHp
	963) 5'-W A C C A G W-3'	PyPyPyPyIm-γ-PyH _p ImImHp
	964) 5'-W A C C A C W-3'	PyPyPyPyPy-γ-ImHpImImHp
	965) 5'-W A C C G T W-3'	PyPyPyImHp-γ-PyPyImImHp
25	966) 5'-W A C C G A W-3'	PyPyPyImPy-γ-HpPyImImHp
	967) 5'-W A C C C T W-3'	PyPyPyPyH _p -γ-PyImImImHp
	968) 5'-W A C C C A W-3'	PyPyPyPyPy-γ-HpImImImHp
	969) 5'-W A C G G G W-3'	PyPyImImIm-γ-PyPyPyImHp
	970) 5'-W A C G G C W-3'	PyPyImImPy-γ-ImPyPyImHp
30	971) 5'-W A C G C G W-3'	PyPyImPyIm-γ-PyImPyImHp
	972) 5'-W A C G C C W-3'	PyPyImPyPy-γ-ImImPyImHp
	973) 5'-W A C C G G W-3'	PyPyPyImIm-γ-PyPyImImHp
	974) 5'-W A C C G C W-3'	PyPyPyImPy-γ-ImPyImImHp
	975) 5'-W A C C C G W-3'	PyPyPyPyIm-γ-PyImImImHp
35	976) 5'-W A C C C C W-3'	PyPyPyPyPy-γ-ImImImImHp

TABLE 44: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGWNW-3'

	DNA sequence	aromatic amino acid sequence
	977) 5'-W T G T T T W-3'	HpImHpHpH γ -PyPyPyPyPy
5	978) 5'-W T G T T A W-3'	HpImHpHpPy- γ -HpPyPyPyPy
	979) 5'-W T G T T G W-3'	HpImHpHpIm- γ -PyPyPyPyPy
	980) 5'-W T G T T C W-3'	HpImHpHpPy- γ -ImPyPyPyPy
	981) 5'-W T G T A T W-3'	HpImHpPyHp- γ -PyHpPyPy
	982) 5'-W T G T A A W-3'	HpImHpPyPy- γ -HpHpPyPy
10	983) 5'-W T G T A G W-3'	HpImHpPyIm- γ -PyHpPyPy
	984) 5'-W T G T A C W-3'	HpImHpPyPy- γ -ImHpPyPy
	985) 5'-W T G T G T W-3'	HpImHpImHp- γ -PyPyPyPy
	986) 5'-W T G T G A W-3'	HpImHpImPy- γ -HpPyPyPy
	987) 5'-W T G T G G W-3'	HpImHpImIm- γ -PyPyPyPy
15	988) 5'-W T G T G C W-3'	HpImHpImPy- γ -ImPyPyPy
	989) 5'-W T G T C T W-3'	HpImHpPyHp- γ -PyImPyPy
	990) 5'-W T G T C A W-3'	HpImHpPyPy- γ -HpImPyPy
	991) 5'-W T G T C G W-3'	HpImHpPyIm- γ -PyImPyPy
	992) 5'-W T G T C C W-3'	HpImHpPyPy- γ -ImImPyPy
20	993) 5'-W T G A T T W-3'	HpImPyHpHp- γ -PyPyHpPy
	994) 5'-W T G A T A W-3'	HpImPyHpPy- γ -HpPyHpPy
	995) 5'-W T G A T G W-3'	HpImPyHpIm- γ -PyPyHpPy
	996) 5'-W T G A T C W-3'	HpImPyHpPy- γ -ImPyHpPy
	997) 5'-W T G A A T W-3'	HpImPyHp- γ -PyHpHpPy
25	998) 5'-W T G A A A W-3'	HpImPyPyPy- γ -HpHpHpPy
	999) 5'-W T G A A G W-3'	HpImPyPyIm- γ -PyHpHpPy
	1000) 5'-W T G A A C W-3'	HpImPyPyPy- γ -ImHpHpPy
	1001) 5'-W T G A G T W-3'	HpImPyImHp- γ -PyPyHpPy
	1002) 5'-W T G A G A W-3'	HpImPyImPy- γ -HpPyHpPy
30	1003) 5'-W T G A G G W-3'	HpImPyImIm- γ -PyPyHpPy
	1004) 5'-W T G A G C W-3'	HpImPyImPy- γ -ImPyHpPy
	1005) 5'-W T G A C T W-3'	HpImPyPyHp- γ -PyImHpPy
	1006) 5'-W T G A C A W-3'	HpImPyPyPy- γ -HpImHpPy
	1007) 5'-W T G A C G W-3'	HpImPyPyIm- γ -PyImHpPy
35	1008) 5'-W T G A C C W-3'	HpImPyPyPy- γ -ImImHpPy

-70-

TABLE 45: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3'

TABLE 45: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3'		
	DNA sequence	aromatic amino acid sequence
5	1009) 5'-W T G G T T W-3'	HpImImHpHp-γ-PyPyPyPyPy
	1010) 5'-W T G G T A W-3'	HpImImHpPy-γ-HpPyPyPyPy
	1011) 5'-W T G G T G W-3'	HpImImHpIm-γ-PyPyPyPyPy
	1012) 5'-W T G G T C W-3'	HpImImHpPy-γ-ImPyPyPyPy
	1013) 5'-W T G G A T W-3'	HpImImPyHp-γ-PyHpPyPyPy
	1014) 5'-W T G G A A W-3'	HpImImPyPy-γ-HpHpPyPyPy
	1015) 5'-W T G G A G W-3'	HpImImPyIm-γ-PyHpPyPyPy
	1016) 5'-W T G G A C W-3'	HpImImPyPy-γ-ImHpPyPyPy
	1017) 5'-W T G G G T W-3'	HpImImImHp-γ-PyPyPyPyPy
	1018) 5'-W T G G G A W-3'	HpImImImPy-γ-HpPyPyPyPy
10	1019) 5'-W T G G C T W-3'	HpImImPyHp-γ-PyImPyPyPy
	1020) 5'-W T G G C A W-3'	HpImImPyPy-γ-HpImPyPyPy
	1021) 5'-W T G C T T W-3'	HpImPyHpHp-γ-PyPyImPyPy
	1022) 5'-W T G C T A W-3'	HpImPyHpPy-γ-HpPyImPyPy
	1023) 5'-W T G C T G W-3'	HpImPyHpIm-γ-PyPyImPyPy
	1024) 5'-W T G C T C W-3'	HpImPyHpPy-γ-ImPyImPyPy
	1025) 5'-W T G C A T W-3'	HpImPyPyHp-γ-PyHpImPyPy
	1026) 5'-W T G C A A W-3'	HpImPyPyPy-γ-HpHpImPyPy
	1027) 5'-W T G C A G W-3'	HpImPyIm-γ-PyHpImPyPy
	1028) 5'-W T G C A C W-3'	HpImPyPyPy-γ-ImHpImPyPy
15	1029) 5'-W T G C G T W-3'	HpImPyImHp-γ-PyPyImPyPy
	1030) 5'-W T G C G A W-3'	HpImPyImPy-γ-HpPyImPyPy
	1031) 5'-W T G C C T W-3'	HpImPyPyHp-γ-PyImImPyPy
	1032) 5'-W T G C C A W-3'	HpImPyPyPy-γ-HpImImPyPy
	1033) 5'-W T G G G G W-3'	HpImImImIm-γ-PyPyPyPy
	1034) 5'-W T G G G C W-3'	HpImImImPy-γ-ImPyPyPyPy
	1035) 5'-W T G G C G W-3'	HpImImPyIm-γ-PyImPyPyPy
	1036) 5'-W T G G C C W-3'	HpImImPyPy-γ-ImImPyPyPy
	1037) 5'-W T G C G G W-3'	HpImPyImIm-γ-PyPyImPyPy
	1038) 5'-W T G C G C W-3'	HpImPyImPy-γ-ImPyImPyPy
20	1039) 5'-W T G C C G W-3'	HpImPyPyIm-γ-PyImImPyPy
	1040) 5'-W T G C C C W-3'	HpImPyPyPy-γ-ImImImPyPy
25		
30		
35		

TABLE 46: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1041) 5'-W T T T T T W-3'	HpHpHpHpH _p -γ-PyPyPyPyPy
	1042) 5'-W T T T T A W-3'	HpHpHpHpPy-γ-HpPyPyPyPy
	1043) 5'-W T T T T G W-3'	HpHpHpHpIm-γ-PyPyPyPyPy
	1044) 5'-W T T T T C W-3'	HpHpHpHpPy-γ-ImPyPyPyPy
	1045) 5'-W T T T A T W-3'	HpHpHpPyH _p -γ-PyH _p PyPyPy
	1046) 5'-W T T T A A W-3'	HpHpHpPyPy-γ-HpH _p PyPyPy
10	1047) 5'-W T T T A G W-3'	HpHpHpPyIm-γ-PyH _p PyPyPy
	1048) 5'-W T T T A C W-3'	HpHpHpPyPy-γ-ImH _p PyPyPy
	1049) 5'-W T T T G T W-3'	HpHpHpImH _p -γ-PyPyPyPyPy
	1050) 5'-W T T T G A W-3'	HpHpHpImPy-γ-HpPyPyPyPy
	1051) 5'-W T T T G G W-3'	HpHpHpImIm-γ-PyPyPyPyPy
15	1052) 5'-W T T T G C W-3'	HpHpHpImPy-γ-ImPyPyPyPy
	1053) 5'-W T T T C T W-3'	HpHpHpPyH _p -γ-PyImPyPyPy
	1054) 5'-W T T T C A W-3'	HpHpHpPyPy-γ-HpImPyPyPy
	1055) 5'-W T T T C G W-3'	HpHpHpPyIm-γ-PyImPyPyPy
	1056) 5'-W T T T C C W-3'	HpHpHpPyPy-γ-ImImPyPyPy
20	1057) 5'-W T T A T T W-3'	HpHpPyH _p H _p -γ-PyPyH _p PyPy
	1058) 5'-W T T A T A W-3'	HpHpPyH _p Py-γ-HpPyH _p PyPy
	1059) 5'-W T T A T G W-3'	HpHpPyH _p Im-γ-PyPyH _p PyPy
	1060) 5'-W T T A T C W-3'	HpHpPyH _p Py-γ-ImPyH _p PyPy
	1061) 5'-W T T A A T W-3'	HpHpPyH _p -γ-PyH _p H _p PyPy
25	1062) 5'-W T T A A A W-3'	HpHpPyPyPy-γ-HpH _p H _p PyPy
	1063) 5'-W T T A A G W-3'	HpHpPyPyIm-γ-PyH _p H _p PyPy
	1064) 5'-W T T A A C W-3'	HpHpPyPyPy-γ-ImH _p H _p PyPy
	1065) 5'-W T T A G T W-3'	HpHpPyImH _p -γ-PyPyH _p PyPy
	1066) 5'-W T T A G A W-3'	HpHpPyImPy-γ-HpPyH _p PyPy
30	1067) 5'-W T T A G G W-3'	HpHpPyImIm-γ-PyPyH _p PyPy
	1068) 5'-W T T A G C W-3'	HpHpPyImPy-γ-ImPyH _p PyPy
	1069) 5'-W T T A C T W-3'	HpHpPyPyH _p -γ-PyImH _p PyPy
	1070) 5'-W T T A C A W-3'	HpHpPyPyPy-γ-HpImH _p PyPy
	1071) 5'-W T T A C G W-3'	HpHpPyPyIm-γ-PyImH _p PyPy
35	1072) 5'-W T T A C C W-3'	HpHpPyPyPy-γ-ImImH _p PyPy

TABLE 47: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTSNW-3'

	DNA sequence	aromatic amino acid sequence
5	1073) 5'-W T T G T T W-3'	HpHpImHpH γ -PyPyPyPyPy
	1074) 5'-W T T G T A W-3'	HpHpImHpPy- γ -HpPyPyPyPy
	1075) 5'-W T T G T G W-3'	HpHpImHpIm- γ -PyPyPyPyPy
	1076) 5'-W T T G T C W-3'	HpHpImHpPy- γ -ImPyPyPyPy
	1077) 5'-W T T G A T W-3'	HpHpImPyH γ -PyH γ PyPyPy
	1078) 5'-W T T G A A W-3'	HpHpImPy- γ -HpH γ PyPyPy
10	1079) 5'-W T T G A G W-3'	HpHpImPyIm- γ -PyH γ PyPyPy
	1080) 5'-W T T G A C W-3'	HpHpImPyPy- γ -ImH γ PyPy
	1081) 5'-W T T G G T W-3'	HpHpImImH γ -PyPyPyPy
	1082) 5'-W T T G G A W-3'	HpHpImImPy- γ -HpPyPyPy
	1083) 5'-W T T G C T W-3'	HpHpImPyH γ -PyImPyPy
15	1084) 5'-W T T G C A W-3'	HpHpImPyPy- γ -HpImPyPy
	1085) 5'-W T T G G G W-3'	HpHpImImIm- γ -PyPyPyPy
	1086) 5'-W T T G G C W-3'	HpHpImImPy- γ -ImPyPyPy
	1087) 5'-W T T G C G W-3'	HpHpImPyIm- γ -PyImPyPy
	1088) 5'-W T T G C C W-3'	HpHpImPyPy- γ -ImImPyPy
20	1089) 5'-W T T C T T W-3'	HpHpPyH γ Py- γ -PyPyImPy
	1090) 5'-W T T C T A W-3'	HpHpPyH γ Py- γ -HpPyImPy
	1091) 5'-W T T C T G W-3'	HpHpPyH γ Py- γ -PyPyImPy
	1092) 5'-W T T C T C W-3'	HpHpPyH γ Py- γ -ImPyImPy
	1093) 5'-W T T C A T W-3'	HpHpPyH γ Py- γ -PyH γ ImPy
25	1094) 5'-W T T C A A W-3'	HpHpPyPyPy- γ -HpH γ ImPy
	1095) 5'-W T T C A G W-3'	HpHpPyPyIm- γ -PyH γ ImPy
	1096) 5'-W T T C A C W-3'	HpHpPyPyPy- γ -ImH γ ImPy
	1097) 5'-W T T C G T W-3'	HpHpPyImH γ -PyPyImPy
	1098) 5'-W T T C G A W-3'	HpHpPyImPy- γ -HpPyImPy
30	1099) 5'-W T T C C T W-3'	HpHpPyPyH γ - γ -PyImImPy
	1100) 5'-W T T C C A W-3'	HpHpPyPyPy- γ -HpImImPy
	1101) 5'-W T T C G G W-3'	HpHpPyImIm- γ -PyPyImPy
	1102) 5'-W T T C G C W-3'	HpHpPyImPy- γ -ImPyImPy
	1103) 5'-W T T C C G W-3'	HpHpPyPyIm- γ -PyImImPy
35	1104) 5'-W T T C C C W-3'	HpHpPyPyPy- γ -ImImImPy

TABLE 48: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1105) 5'-W T A T T T W-3'	HpPyHpHpH _p -γ-PyPyPyH _p Py
	1106) 5'-W T A T T A W-3'	HpPyHpH _p Py-γ-HpPyPyH _p Py
	1107) 5'-W T A T T G W-3'	HpPyHpH _p Im-γ-PyPyPyH _p Py
	1108) 5'-W T A T T C W-3'	HpPyHpH _p Py-γ-ImPyPyH _p Py
	1109) 5'-W T A T A T W-3'	HpPyH _p PyH _p -γ-PyH _p PyH _p Py
	1110) 5'-W T A T A A W-3'	HpPyH _p PyPy-γ-HpH _p PyH _p Py
10	1111) 5'-W T A T A G W-3'	HpPyH _p PyIm-γ-PyH _p PyH _p Py
	1112) 5'-W T A T A C W-3'	HpPyH _p PyPy-γ-ImH _p PyH _p Py
	1113) 5'-W T A T G T W-3'	HpPyH _p ImH _p -γ-PyPyPyH _p Py
	1114) 5'-W T A T G A W-3'	HpPyH _p ImPy-γ-HpPyPyH _p Py
	1115) 5'-W T A T G G W-3'	HpPyH _p ImIm-γ-PyPyPyH _p Py
15	1116) 5'-W T A T G C W-3'	HpPyH _p ImPy-γ-ImPyPyH _p Py
	1117) 5'-W T A T C T W-3'	HpPyH _p PyH _p -γ-PyImPyH _p Py
	1118) 5'-W T A T C A W-3'	HpPyH _p PyPy-γ-HpImPyH _p Py
	1119) 5'-W T A T C G W-3'	HpPyH _p PyIm-γ-PyImPyH _p Py
	1120) 5'-W T A T C C W-3'	HpPyH _p PyPy-γ-ImImPyH _p Py
20	1121) 5'-W T A A T T W-3'	HpPyPyH _p H _p -γ-PyPyH _p Py
	1122) 5'-W T A A T A W-3'	HpPyPyH _p Py-γ-HpPyH _p Py
	1123) 5'-W T A A T G W-3'	HpPyPyH _p Im-γ-PyPyH _p Py
	1124) 5'-W T A A T C W-3'	HpPyPyH _p Py-γ-ImPyH _p Py
	1125) 5'-W T A A A T W-3'	HpPyPyH _p Py-γ-PyH _p PyH _p Py
25	1126) 5'-W T A A A A W-3'	HpPyPyPy-γ-HpH _p PyH _p Py
	1127) 5'-W T A A A G W-3'	HpPyPyPyIm-γ-PyH _p PyH _p Py
	1128) 5'-W T A A A C W-3'	HpPyPyPyPy-γ-ImH _p PyH _p Py
	1129) 5'-W T A A G T W-3'	HpPyPyImH _p -γ-PyPyH _p Py
	1130) 5'-W T A A G A W-3'	HpPyPyImPy-γ-HpPyH _p Py
30	1131) 5'-W T A A G G W-3'	HpPyPyImIm-γ-PyPyH _p Py
	1132) 5'-W T A A G C W-3'	HpPyPyImPy-γ-ImPyH _p Py
	1133) 5'-W T A A C T W-3'	HpPyPyPyH _p -γ-PyImH _p Py
	1134) 5'-W T A A C A W-3'	HpPyPyPyPy-γ-HpImH _p Py
	1135) 5'-W T A A C G W-3'	HpPyPyPyIm-γ-PyImH _p Py
35	1136) 5'-W T A A C C W-3'	HpPyPyPyPy-γ-ImImH _p Py

TABLE 49: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1137) 5'-W T A G T T W-3'	HpPyImHpH _p -γ-PyPyPyH _p Py
	1138) 5'-W T A G T A W-3'	HpPyImHpPy-γ-HpPyPyH _p Py
	1139) 5'-W T A G T G W-3'	HpPyImHpIm-γ-PyPyPyH _p Py
	1140) 5'-W T A G T C W-3'	HpPyImHpPy-γ-ImPyPyH _p Py
	1141) 5'-W T A G A T W-3'	HpPyImPyH _p -γ-PyH _p PyH _p Py
	1142) 5'-W T A G A A W-3'	HpPyImPyPy-γ-HpH _p PyH _p Py
10	1143) 5'-W T A G A G W-3'	HpPyImPyIm-γ-PyH _p PyH _p Py
	1144) 5'-W T A G A C W-3'	HpPyImPyPy-γ-ImH _p PyH _p Py
	1145) 5'-W T A G G T W-3'	HpPyImImH _p -γ-PyPyPyH _p Py
	1146) 5'-W T A G G A W-3'	HpPyImImPy-γ-HpPyPyH _p Py
	1147) 5'-W T A G C T W-3'	HpPyImPyH _p -γ-PyImPyH _p Py
15	1148) 5'-W T A G C A W-3'	HpPyImPyPy-γ-HpImPyH _p Py
	1149) 5'-W T A G G G W-3'	HpPyImImIm-γ-PyPyPyH _p Py
	1150) 5'-W T A G G C W-3'	HpPyImImPy-γ-ImPyPyH _p Py
	1151) 5'-W T A G C G W-3'	HpPyImPyIm-γ-PyImPyH _p Py
	1152) 5'-W T A G C C W-3'	HpPyImPyPy-γ-ImImPyH _p Py
20	1153) 5'-W T A C T T W-3'	HpPyPyH _p H _p -γ-PyPyImH _p Py
	1154) 5'-W T A C T A W-3'	HpPyPyH _p Py-γ-HpPyImH _p Py
	1155) 5'-W T A C T G W-3'	HpPyPyH _p Im-γ-PyPyImH _p Py
	1156) 5'-W T A C T C W-3'	HpPyPyH _p Py-γ-ImPyImH _p Py
	1157) 5'-W T A C A T W-3'	HpPyPyH _p Py-γ-PyH _p ImH _p Py
25	1158) 5'-W T A C A A W-3'	HpPyPyPyH _p -γ-HpH _p ImH _p Py
	1159) 5'-W T A C A G W-3'	HpPyPyPyIm-γ-PyH _p ImH _p Py
	1160) 5'-W T A C A C W-3'	HpPyPyPyPy-γ-ImH _p ImH _p Py
	1161) 5'-W T A C G T W-3'	HpPyPyImH _p -γ-PyPyImH _p Py
	1162) 5'-W T A C G A W-3'	HpPyPyImPy-γ-HpPyImH _p Py
30	1163) 5'-W T A C C T W-3'	HpPyPyPyH _p -γ-PyImImH _p Py
	1164) 5'-W T A C C A W-3'	HpPyPyPyPy-γ-HpImImH _p Py
	1165) 5'-W T A C G G W-3'	HpPyPyImIm-γ-PyPyImH _p Py
	1166) 5'-W T A C G C W-3'	HpPyPyImPy-γ-ImPyImH _p Py
	1167) 5'-W T A C C G W-3'	HpPyPyPyIm-γ-PyImImH _p Py
35	1168) 5'-W T A C C C W-3'	HpPyPyPyPy-γ-ImImImH _p Py

TABLE 50: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1169) 5'-W T C T T T W-3'	HpPyHpHpPy-γ-PyPyPyImPy
	1170) 5'-W T C T T A W-3'	HpPyHpHpPy-γ-HpPyPyImPy
	1171) 5'-W T C T T G W-3'	HpPyHpHpIm-γ-PyPyPyImPy
	1172) 5'-W T C T T C W-3'	HpPyHpHpPy-γ-ImPyPyImPy
	1173) 5'-W T C T A T W-3'	HpPyHpPyHp-γ-PyHppPyImPy
	1174) 5'-W T C T A A W-3'	HpPyHpPyPy-γ-HpHppPyImPy
10	1175) 5'-W T C T A G W-3'	HpPyHpPyIm-γ-PyHppPyImPy
	1176) 5'-W T C T A C W-3'	HpPyHpPyPy-γ-ImHppPyImPy
	1177) 5'-W T C T G T W-3'	HpPyHpImHp-γ-PyPyPyImPy
	1178) 5'-W T C T G A W-3'	HpPyHpImPy-γ-HpPyPyImPy
	1179) 5'-W T C T G G W-3'	HpPyHpImIm-γ-PyPyPyImPy
15	1180) 5'-W T C T G C W-3'	HpPyHpImPy-γ-ImPyPyImPy
	1181) 5'-W T C T C T W-3'	HpPyHpPyHp-γ-PyImPyImPy
	1182) 5'-W T C T C A W-3'	HpPyHpPyPy-γ-HpImPyImPy
	1183) 5'-W T C T C G W-3'	HpPyHpPyIm-γ-PyImPyImPy
	1184) 5'-W T C T C C W-3'	HpPyHpPyPy-γ-ImImPyImPy
20	1185) 5'-W T C A T T W-3'	HpPyPyHpHp-γ-PyPyHpImPy
	1186) 5'-W T C A T A W-3'	HpPyPyHpPy-γ-HpPyHpImPy
	1187) 5'-W T C A T G W-3'	HpPyPyHpIm-γ-PyPyHpImPy
	1188) 5'-W T C A T C W-3'	HpPyPyHpPy-γ-ImPyHpImPy
	1189) 5'-W T C A A T W-3'	HpPyPyPyHp-γ-PyHppHpImPy
25	1190) 5'-W T C A A A W-3'	HpPyPyPyPy-γ-HpHppHpImPy
	1191) 5'-W T C A A G W-3'	HpPyPyPyIm-γ-PyHppHpImPy
	1192) 5'-W T C A A C W-3'	HpPyPyPyPy-γ-ImHppHpImPy
	1193) 5'-W T C A G T W-3'	HpPyPyImHp-γ-PyPyHpImPy
	1194) 5'-W T C A G A W-3'	HpPyPyImPy-γ-HpPyHpImPy
30	1195) 5'-W T C A G G W-3'	HpPyPyImIm-γ-PyPyHpImPy
	1196) 5'-W T C A G C W-3'	HpPyPyImPy-γ-ImPyHpImPy
	1197) 5'-W T C A C T W-3'	HpPyPyPyHp-γ-PyImHpImPy
	1198) 5'-W T C A C A W-3'	HpPyPyPyPy-γ-HpImHpImPy
	1199) 5'-W T C A C G W-3'	HpPyPyPyIm-γ-PyImHpImPy
35	1200) 5'-W T C A C C W-3'	HpPyPyPyPy-γ-ImImHpImPy

TABLE 51: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1201) 5'-W T C G T T W-3'	HpPyImHpH _p -γ-PyPyPyImPy
	1202) 5'-W T C G T A W-3'	HpPyImHpPy-γ-HpPyPyImPy
	1203) 5'-W T C G T G W-3'	HpPyImHpIm-γ-PyPyPyImPy
	1204) 5'-W T C G T C W-3'	HpPyImHpPy-γ-ImPyPyImPy
	1205) 5'-W T C G A T W-3'	HpPyImPyH _p -γ-PyH _p PyImPy
10	1206) 5'-W T C G A A W-3'	HpPyImPyPy-γ-HpH _p PyImPy
	1207) 5'-W T C G A G W-3'	HpPyImPyIm-γ-PyH _p PyImPy
	1208) 5'-W T C G A C W-3'	HpPyImPyPy-γ-ImH _p PyImPy
	1209) 5'-W T C G G T W-3'	HpPyImImH _p -γ-PyPyPyImPy
	1210) 5'-W T C G G A W-3'	HpPyImImPy-γ-HpPyPyImPy
15	1211) 5'-W T C G C T W-3'	HpPyImPyH _p -γ-PyImPyImPy
	1212) 5'-W T C G C A W-3'	HpPyImPyPy-γ-HpImPyImPy
	1213) 5'-W T C C T T W-3'	HpPyPyH _p H _p -γ-PyPyImImPy
	1214) 5'-W T C C T A W-3'	HpPyPyH _p Py-γ-HpPyImImPy
	1215) 5'-W T C C T G W-3'	HpPyPyH _p Im-γ-PyPyImImPy
20	1216) 5'-W T C C T C W-3'	HpPyPyH _p Py-γ-ImPyImImPy
	1217) 5'-W T C C A T W-3'	HpPyPyPyH _p -γ-PyH _p ImImPy
	1218) 5'-W T C C A A W-3'	HpPyPyPyPy-γ-HpH _p ImImPy
	1219) 5'-W T C C A G W-3'	HpPyPyPyIm-γ-PyH _p ImImPy
	1220) 5'-W T C C A C W-3'	HpPyPyPyPy-γ-ImH _p ImImPy
25	1221) 5'-W T C C G T W-3'	HpPyPyImH _p -γ-PyPyImImPy
	1222) 5'-W T C C G A W-3'	HpPyPyImPy-γ-HpPyImImPy
	1223) 5'-W T C C C T W-3'	HpPyPyPyH _p -γ-PyImImImPy
	1224) 5'-W T C C C A W-3'	HpPyPyPyPy-γ-HpImImImPy
	1225) 5'-W T C G G G W-3'	HpPyImImIm-γ-PyPyPyImPy
30	1226) 5'-W T C G G C W-3'	HpPyImImPy-γ-ImPyPyImPy
	1227) 5'-W T C G C G W-3'	HpPyImPyIm-γ-PyImPyImPy
	1228) 5'-W T C G C C W-3'	HpPyImPyPy-γ-ImImPyImPy
	1229) 5'-W T C C G G W-3'	HpPyPyImIm-γ-PyPyImImPy
	1230) 5'-W T C C G C W-3'	HpPyPyImPy-γ-ImPyImImPy
35	1231) 5'-W T C C C G W-3'	HpPyPyPyIm-γ-PyImImImPy
	1232) 5'-W T C C C C W-3'	HpPyPyPyPy-γ-ImImImImPy

TABLE 52: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	243 β) 5'-W G G T T G W-3'	ImIm- β -HpIm- γ -PyPyPyPyPy
	243 β p) 5'-W G G T T G W-3'	ImIm- β -HpIm- γ -PyPy- β -PyPy
10	247 β) 5'-W G G T A G W-3'	ImIm- β -PyIm- γ -PyHpPyPyPy
	247 β p) 5'-W G G T A G W-3'	ImIm- β -PyIm- γ -PyHp- β -PyPy
15	249 β) 5'-W G G T G T W-3'	ImIm- β -ImHp- γ -PyPyPyPyPy
	249 β p) 5'-W G G T G T W-3'	ImIm- β -ImHp- γ -PyPy- β -PyPy
20	250 β) 5'-W G G T G A W-3'	ImIm- β -ImPy- γ -HpPyPyPyPy
	250 β p) 5'-W G G T G A W-3'	ImIm- β -ImPy- γ -HpPy- β -PyPy
25	251 β) 5'-W G G T G G W-3'	ImIm- β -ImIm- γ -PyPyPyPyPy
	251 β p) 5'-W G G T G G W-3'	ImIm- β -ImIm- γ -PyPy- β -PyPy
30	252 β) 5'-W G G T G C W-3'	ImIm- β -ImPy- γ -ImPyPyPyPy
	252 β p) 5'-W G G T G C W-3'	ImIm- β -ImPy- γ -ImPy- β -PyPy
35	255 β) 5'-W G G T C G W-3'	ImIm- β -PyIm- γ -PyImPyPyPy
	255 β p) 5'-W G G T C G W-3'	ImIm- β -PyIm- γ -PyIm- β -PyPy
40	259 β) 5'-W G G A T G W-3'	ImIm- β -HpIm- γ -PyPyHpPyPy
	259 β p) 5'-W G G A T G W-3'	ImIm- β -HpIm- γ -PyPy- β -PyPy
45	263 β) 5'-W G G A A G W-3'	ImIm- β -PyIm- γ -PyHpHpPyPy
	263 β p) 5'-W G G A A G W-3'	ImIm- β -PyIm- γ -PyHp- β -PyPy
50	265 β) 5'-W G G A G T W-3'	ImIm- β -ImHp- γ -PyPyHpPyPy
	265 β p) 5'-W G G A G T W-3'	ImIm- β -ImHp- γ -PyPy- β -PyPy
55	266 β) 5'-W G G A G A W-3'	ImIm- β -ImPy- γ -HpPyHpPyPy
	266 β p) 5'-W G G A G A W-3'	ImIm- β -ImPy- γ -HpPy- β -PyPy
60	267 β) 5'-W G G A G G W-3'	ImIm- β -ImIm- γ -PyPyHpPyPy
	267 β p) 5'-W G G A G G W-3'	ImIm- β -ImIm- γ -PyPy- β -PyPy
65	268 β) 5'-W G G A G C W-3'	ImIm- β -ImPy- γ -ImPyHpPyPy
	268 β p) 5'-W G G A G C W-3'	ImIm- β -ImPy- γ -ImPy- β -PyPy
70	271 β) 5'-W G G A C G W-3'	ImIm- β -PyIm- γ -PyImHpPyPy
	271 β p) 5'-W G G A C G W-3'	ImIm- β -PyIm- γ -PyIm- β -PyPy

TABLE 53: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGSNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	273 β) 5'-W G G G T T W-3'	ImImIm- β -Hp- γ -PyPyPyPyPy
	273 β p) 5'-W G G G T T W-3'	ImImIm- β -Hp- γ -Py- β -PyPyPy
	274 β) 5'-W G G G T A W-3'	ImImIm- β -Py- γ -HpPyPyPyPy
	274 β p) 5'-W G G G T A W-3'	ImImIm- β -Py- γ -Hp- β -PyPyPy
	275 β) 5'-W G G G T G W-3'	ImImIm- β -Im- γ -PyPyPyPyPy
	275 β p) 5'-W G G G T G W-3'	ImImIm- β -Im- γ -Py- β -PyPyPy
10	276 β) 5'-W G G G T C W-3'	ImImIm- β -Py- γ -ImPyPyPyPy
	276 β p) 5'-W G G G T C W-3'	ImImIm- β -Py- γ -Im- β -PyPyPy
	277 β) 5'-W G G G A T W-3'	ImImIm- β -Hp- γ -PyHpPyPyPy
	277 β p) 5'-W G G G A T W-3'	ImImIm- β -Hp- γ -Py- β -PyPyPy
	278 β) 5'-W G G G A A W-3'	ImImIm- β -Py- γ -HpHpPyPyPy
15	278 β p) 5'-W G G G A A W-3'	ImImIm- β -Py- γ -Hp- β -PyPyPy
	279 β) 5'-W G G G A G W-3'	ImImIm- β -Im- γ -PyHpPyPyPy
	279 β p) 5'-W G G G A G W-3'	ImImIm- β -Im- γ -Py- β -PyPyPy
	280 β) 5'-W G G G A C W-3'	ImImIm- β -Py- γ -ImHpPyPyPy
	280 β p) 5'-W G G G A C W-3'	ImImIm- β -Py- γ -Im- β -PyPyPy
20	283 β) 5'-W G G G C T W-3'	ImImIm- β -Hp- γ -PyImPyPyPy
	284 β) 5'-W G G G C A W-3'	ImImIm- β -Py- γ -HpImPyPyPy
	285 β) 5'-W G G C T T W-3'	ImImPyHpHp- γ -Py- β -ImPyPy
	285 β p) 5'-W G G C T T W-3'	ImImPy- β -Hp- γ -Py- β -ImPyPy
	286 β) 5'-W G G C T A W-3'	ImImPyHpPy- γ -Hp- β -ImPyPy
25	286 β p) 5'-W G G C T A W-3'	ImImPy- β -Py- γ -Hp- β -ImPyPy
	287 β) 5'-W G G C T G W-3'	ImIm- β -HpIm- γ -Py- β -ImPyPy
	288 β) 5'-W G G C T C W-3'	ImImPyHpPy- γ -Im- β -ImPyPy
	288 β p) 5'-W G G C T C W-3'	ImImPy- β -Py- γ -Im- β -ImPyPy
	289 β) 5'-W G G C A T W-3'	ImImPyPyHp- γ -Py- β -ImPyPy
30	289 β p) 5'-W G G C A T W-3'	ImImPy- β -Hp- γ -Py- β -ImPyPy
	290 β) 5'-W G G C A A W-3'	ImImPyPyPy- γ -Hp- β -ImPyPy
	290 β p) 5'-W G G C A A W-3'	ImImPy- β -Py- γ -Hp- β -ImPyPy

TABLE 53 (cont.): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGGSNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	291 β) 5'-W G G C A G W-3'	ImIm- β -PyIm- γ -Py- β -ImPyPy
	292 β) 5'-W G G C A C W-3'	ImImPyPyPy- γ -Im- β -ImPyPy
5	292 β p) 5'-W G G C A C W-3'	ImImPy- β -Py- γ -Im- β -ImPyPy
	293 β) 5'-W G G C G T W-3'	ImIm- β -ImHp- γ -Py- β -ImPyPy
	294 β) 5'-W G G C G A W-3'	ImIm- β -ImPy- γ -Hp- β -ImPyPy
	295 β) 5'-W G G C C T W-3'	ImImPyPyHp- γ -PyImIm- β -Py
	296 β) 5'-W G G C C A W-3'	ImImPyPyPy- γ -HpImIm- β -Py
10	G19 β) 5'-W G G G C G W-3'	ImImIm- β -Im- γ -PyImPyPyPy
	G20 β) 5'-W G G G C C W-3'	ImImIm- β -Py- γ -ImImPyPyPy
	G21 β) 5'-W G G C G G W-3'	ImIm- β -ImIm- γ -Py- β -ImPyPy
	G22 β) 5'-W G G C G C W-3'	ImIm- β -ImPy- γ -Im- β -ImPyPy
	G23 β) 5'-W G G C C G W-3'	ImIm- β -PyIm- γ -PyImIm- β -Py
15	G24 β) 5'-W G G C C C W-3'	ImImPyPyPy- γ -ImImIm- β -Py

-80-

TABLE 54: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	299 β) 5'-W G T T T G W-3'	ImHp- β -HpIm- γ -PyPyPyPyPy
	299 β p) 5'-W G T T T G W-3'	ImHp- β -HpIm- γ -PyPy- β -PyPy
5	303 β) 5'-W G T T A G W-3'	ImHp- β -PyIm- γ -PyHpPyPyPy
	303 β p) 5'-W G T T A G W-3'	ImHp- β -PyIm- γ -PyHp- β -PyPy
	305 β) 5'-W G T T G T W-3'	ImHp- β -ImHp- γ -PyPyPyPyPy
	305 β p) 5'-W G T T G T W-3'	ImHp- β -ImHp- γ -PyPy- β -PyPy
10	306 β) 5'-W G T T G A W-3'	ImHp- β -ImPy- γ -HpPyPyPy
	306 β p) 5'-W G T T G A W-3'	ImHp- β -ImPy- γ -HpPy- β -PyPy
	307 β) 5'-W G T T G G W-3'	ImHp- β -ImIm- γ -PyPyPyPy
	307 β p) 5'-W G T T G G W-3'	ImHp- β -ImIm- γ -PyPy- β -PyPy
	308 β) 5'-W G T T G C W-3'	ImHp- β -ImPy- γ -ImPyPyPy
	308 β p) 5'-W G T T G C W-3'	ImHp- β -ImPy- γ -ImPy- β -PyPy
15	311 β) 5'-W G T T C G W-3'	ImHp- β -PyIm- γ -PyImPyPy
	311 β p) 5'-W G T T C G W-3'	ImHp- β -PyIm- γ -PyIm- β -PyPy
	315 β) 5'-W G T A T G W-3'	ImHp- β -HpIm- γ -PyPy
	315 β p) 5'-W G T A T G W-3'	ImHp- β -HpIm- γ -PyPy- β -PyPy
	319 β) 5'-W G T A A G W-3'	ImHp- β -PyIm- γ -PyHpH _p Py
20	319 β p) 5'-W G T A A G W-3'	ImHp- β -PyIm- γ -PyHp- β -PyPy
	321 β) 5'-W G T A G T W-3'	ImHp- β -ImHp- γ -PyPyH _p Py
	321 β p) 5'-W G T A G T W-3'	ImHp- β -ImHp- γ -PyPy- β -PyPy
	322 β) 5'-W G T A G A W-3'	ImHp- β -ImPy- γ -HpPyH _p Py
	322 β p) 5'-W G T A G A W-3'	ImHp- β -ImPy- γ -HpPy- β -PyPy
25	323 β) 5'-W G T A G G W-3'	ImHp- β -ImIm- γ -PyPyH _p Py
	323 β p) 5'-W G T A G G W-3'	ImHp- β -ImIm- γ -PyPy- β -PyPy
	324 β) 5'-W G T A G C W-3'	ImHp- β -ImPy- γ -ImPyH _p Py
	324 β p) 5'-W G T A G C W-3'	ImHp- β -ImPy- γ -ImPy- β -PyPy
	327 β) 5'-W G T A C G W-3'	ImHp- β -PyIm- γ -PyImHpPy
30	327 β p) 5'-W G T A C G W-3'	ImHp- β -PyIm- γ -PyIm- β -PyPy

TABLE 55: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	329 β) 5'-W G T G T T W-3'	Im- β -ImH _p H _p - γ -PyPyPyPyPy
5	329 β p) 5'-W G T G T T W-3'	Im- β -ImH _p H _p - γ -PyPyPyPy- β -Py
	330 β) 5'-W G T G T A W-3'	Im- β -ImH _p Py- γ -H _p PyPyPyPy
	330 β p) 5'-W G T G T A W-3'	Im- β -ImH _p Py- γ -H _p PyPy- β -Py
	331 β) 5'-W G T G T G W-3'	Im- β -ImH _p Im- γ -PyPyPyPy
	331 β p) 5'-W G T G T G W-3'	Im- β -ImH _p Im- γ -PyPyPy- β -Py
10	332 β) 5'-W G T G T C W-3'	Im- β -ImH _p Py- γ -ImPyPyPyPy
	332 β p) 5'-W G T G T C W-3'	Im- β -ImH _p Py- γ -ImPyPy- β -Py
	333 β) 5'-W G T G A T W-3'	Im- β -ImPyH _p - γ -PyH _p PyPyPy
	333 β p) 5'-W G T G A T W-3'	Im- β -ImPyH _p - γ -PyH _p Py- β -Py
	334 β) 5'-W G T G A A W-3'	Im- β -ImPyPy- γ -H _p H _p PyPy
15	334 β p) 5'-W G T G A A W-3'	Im- β -ImPyPy- γ -H _p H _p Py- β -Py
	335 β) 5'-W G T G A G W-3'	Im- β -ImPyIm- γ -PyH _p PyPy
	335 β p) 5'-W G T G A G W-3'	Im- β -ImPyIm- γ -PyH _p Py- β -Py
	336 β) 5'-W G T G A C W-3'	Im- β -ImPyPy- γ -ImH _p PyPy
	336 β p) 5'-W G T G A C W-3'	Im- β -ImPyPy- γ -ImH _p Py- β -Py
20	337 β) 5'-W G T G G T W-3'	Im- β -ImImH _p - γ -PyPyPyPy
	337 β p) 5'-W G T G G T W-3'	Im- β -ImImH _p - γ -PyPyPy- β -Py
	338 β) 5'-W G T G G A W-3'	Im- β -ImImPy- γ -H _p PyPyPy
	338 β p) 5'-W G T G G A W-3'	Im- β -ImImPy- γ -H _p PyPy- β -Py
	339 β) 5'-W G T G C T W-3'	Im- β -ImPyH _p - γ -PyImPyPy
25	339 β p) 5'-W G T G C T W-3'	Im- β -ImPyH _p - γ -PyImPy- β -Py
	340 β) 5'-W G T G C A W-3'	Im- β -ImPyPy- γ -H _p ImPyPy
	340 β p) 5'-W G T G C A W-3'	Im- β -ImPyPy- γ -H _p ImPy- β -Py
	341 β) 5'-W G T G G G W-3'	Im- β -ImImIm- γ -PyPyPyPy
	341 β p) 5'-W G T G G G W-3'	Im- β -ImImIm- γ -PyPyPy- β -Py
30	342 β) 5'-W G T G G C W-3'	Im- β -ImImPy- γ -ImPyPyPy
	342 β p) 5'-W G T G G C W-3'	Im- β -ImImPy- γ -ImPyPy- β -Py
	343 β) 5'-W G T G C G W-3'	Im- β -ImPyIm- γ -PyImPyPy

TABLE 55 (cont.): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	343 β p) 5'-W G T G C G W-3'	Im- β -ImPyIm- γ -PyImPy- β -Py
	344 β) 5'-W G T G C C W-3'	Im- β -ImPyPy- γ -ImImPyPyPy
5	344 β p) 5'-W G T G C C W-3'	Im- β -ImPyPy- γ -ImImPy- β -Py
	345 β) 5'-W G T C T T W-3'	ImHpPyHpHp- γ -Py- β -ImPyPy
	345 β p) 5'-W G T C T T W-3'	ImHpPy- β -Hp- γ -Py- β -ImPyPy
	346 β) 5'-W G T C T A W-3'	ImHpPyHpPy- γ -Hp- β -ImPyPy
	346 β p) 5'-W G T C T A W-3'	ImHpPy- β -Py- γ -Hp- β -ImPyPy
10	347 β) 5'-W G T C T G W-3'	ImHp- β -HpIm- γ -Py- β -ImPyPy
	348 β) 5'-W G T C T C W-3'	ImHpPyHpPy- γ -Im- β -ImPyPy
	348 β p) 5'-W G T C T C W-3'	ImHpPy- β -Py- γ -Im- β -ImPyPy
	349 β) 5'-W G T C A T W-3'	ImHpPyHp- γ -Py- β -ImPyPy
	349 β p) 5'-W G T C A T W-3'	ImHpPyPyHp- γ -Py- β -ImPyPy
15	350 β) 5'-W G T C A A W-3'	ImHpPyPyPy- γ -Hp- β -ImPyPy
	350 β p) 5'-W G T C A A W-3'	ImHpPy- β -Py- γ -Hp- β -ImPyPy
	351 β) 5'-W G T C A G W-3'	ImHp- β -PyIm- γ -Py- β -ImPyPy
	352 β) 5'-W G T C A C W-3'	ImHpPyPyPy- γ -Im- β -ImPyPy
	352 β p) 5'-W G T C A C W-3'	ImHpPy- β -Py- γ -Im- β -ImPyPy
20	353 β) 5'-W G T C G T W-3'	ImHp- β -ImHp- γ -Py- β -ImPyPy
	354 β) 5'-W G T C G A W-3'	ImHp- β -ImPy- γ -Hp- β -ImPyPy
	355 β) 5'-W G T C C T W-3'	ImHpPyPyHp- γ -PyImIm- β -Py
	355 β p) 5'-W G T C C T W-3'	Im- β -PyPyHp- γ -PyImIm- β -Py
	356 β) 5'-W G T C C A W-3'	ImHpPyPyPy- γ -HpImIm- β -Py
	356 β p) 5'-W G T C C A W-3'	Im- β -PyPyPy- γ -HpImIm- β -Py
25	357 β) 5'-W G T C G G W-3'	ImHp- β -ImIm- γ -Py- β -ImPyPy
	358 β) 5'-W G T C G C W-3'	ImHp- β -ImPy- γ -Im- β -ImPyPy
	359 β) 5'-W G T C C G W-3'	ImHp- β -PyIm- γ -PyImIm- β -Py
	360 β) 5'-W G T C C C W-3'	ImHpPyPyPy- γ -ImImIm- β -Py
30	360 β p) 5'-W G T C C C W-3'	Im- β -PyPyPy- γ -ImImIm- β -Py

TABLE 56: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGA_nW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	363 β) 5'-W G A T T G W-3'	ImPy- β -HpIm- γ -PyPyPyHpPy
	363 β p) 5'-W G A T T G W-3'	ImPy- β -HpIm- γ -PyPy- β -HpPy
5	367 β) 5'-W G A T A G W-3'	ImPy- β -PyIm- γ -PyHpPyHpPy
	367 β p) 5'-W G A T A G W-3'	ImPy- β -PyIm- γ -PyHp- β -HpPy
	369 β) 5'-W G A T G T W-3'	ImPy- β -ImHp- γ -PyPyPyHpPy
	369 β p) 5'-W G A T G T W-3'	ImPy- β -ImHp- γ -PyPy- β -HpPy
10	370 β) 5'-W G A T G A W-3'	ImPy- β -ImPy- γ -HpPyPyHpPy
	370 β p) 5'-W G A T G A W-3'	ImPy- β -ImPy- γ -HpPy- β -HpPy
	371 β) 5'-W G A T G G W-3'	ImPy- β -ImIm- γ -PyPyPyHpPy
	371 β p) 5'-W G A T G G W-3'	ImPy- β -ImIm- γ -PyPy- β -HpPy
15	372 β) 5'-W G A T G C W-3'	ImPy- β -ImPy- γ -ImPyPyHpPy
	372 β p) 5'-W G A T G C W-3'	ImPy- β -ImPy- γ -ImPy- β -HpPy
	375 β) 5'-W G A T C G W-3'	ImPy- β -PyIm- γ -PyImPyHpPy
	375 β p) 5'-W G A T C G W-3'	ImPy- β -PyIm- γ -PyIm- β -HpPy
	379 β) 5'-W G A A T G W-3'	ImPy- β -HpIm- γ -PyPyHpPy
	379 β p) 5'-W G A A T G W-3'	ImPy- β -HpIm- γ -PyPy- β -HpPy
20	383 β) 5'-W G A A A G W-3'	ImPy- β -PyIm- γ -PyHpHpHpPy
	383 β p) 5'-W G A A A G W-3'	ImPy- β -PyIm- γ -PyHp- β -HpPy
	385 β) 5'-W G A A G T W-3'	ImPy- β -ImHp- γ -PyPyHpHpPy
	385 β p) 5'-W G A A G T W-3'	ImPy- β -ImHp- γ -PyPy- β -HpPy
25	386 β) 5'-W G A A G A W-3'	ImPy- β -ImPy- γ -HpPyHpHpPy
	386 β p) 5'-W G A A G A W-3'	ImPy- β -ImPy- γ -HpPy- β -HpPy
	387 β) 5'-W G A A G G W-3'	ImPy- β -ImIm- γ -PyPyHpHpPy
	387 β p) 5'-W G A A G G W-3'	ImPy- β -ImIm- γ -PyPy- β -HpPy
	388 β) 5'-W G A A G C W-3'	ImPy- β -ImPy- γ -ImPyHpHpPy
	388 β p) 5'-W G A A G C W-3'	ImPy- β -ImPy- γ -ImPy- β -HpPy
30	391 β) 5'-W G A A C G W-3'	ImPy- β -PyIm- γ -PyImHpHpPy
	391 β p) 5'-W G A A C G W-3'	ImPy- β -PyIm- γ -PyIm- β -HpPy

TABLE 57: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	393 β) 5'-W G A G T T W-3'	Im- β -ImHpHp- γ -PyPyPyHpPy
	394 β p) 5'-W G A G T A W-3'	Im- β -ImHpPy- γ -HpPyPy- β -Py
5	395 β) 5'-W G A G T G W-3'	Im- β -ImHpIm- γ -PyPyPyHpPy
	395 β p) 5'-W G A G T G W-3'	Im- β -ImHpIm- γ -PyPyPy- β -Py
	396 β) 5'-W G A G T C W-3'	Im- β -ImHpPy- γ -ImPyPyHpPy
	396 β p) 5'-W G A G T C W-3'	Im- β -ImHpPy- γ -ImPyPy- β -Py
10	397 β) 5'-W G A G A T W-3'	Im- β -ImPyHp- γ -PyHpPyHpPy
	398 β) 5'-W G A G A A W-3'	Im- β -ImPyPy- γ -HpHpPyHpPy
	398 β p) 5'-W G A G A A W-3'	Im- β -ImPyPy- γ -HpHpPy- β -Py
	399 β) 5'-W G A G A G W-3'	Im- β -ImPyIm- γ -PyHpPyHpPy
	399 β p) 5'-W G A G A G W-3'	Im- β -ImPyIm- γ -PyHpPy- β -Py
15	400 β) 5'-W G A G A C W-3'	Im- β -ImPyPy- γ -ImHpPyHpPy
	400 β p) 5'-W G A G A C W-3'	Im- β -ImPyPy- γ -ImHpPy- β -Py
	401 β) 5'-W G A G G T W-3'	Im- β -ImImHp- γ -PyPyPyHpPy
	401 β p) 5'-W G A G G T W-3'	Im- β -ImImHp- γ -PyPyPy- β -Py
	402 β) 5'-W G A G G A W-3'	Im- β -ImImPy- γ -HpPyPyHpPy
20	402 β p) 5'-W G A G G A W-3'	Im- β -ImImPy- γ -HpPyPy- β -Py
	403 β) 5'-W G A G C T W-3'	Im- β -ImPyHp- γ -PyImPyHpPy
	403 β p) 5'-W G A G C T W-3'	Im- β -ImPyHp- γ -PyImPy- β -Py
	404 β) 5'-W G A G C A W-3'	Im- β -ImPyPy- γ -HpImPyHpPy
	404 β p) 5'-W G A G C A W-3'	Im- β -ImPyPy- γ -HpImPy- β -Py
25	405 β) 5'-W G A G G G W-3'	Im- β -ImImIm- γ -PyPyPyHpPy
	405 β p) 5'-W G A G G G W-3'	Im- β -ImImIm- γ -PyPyPy- β -Py
	406 β) 5'-W G A G G C W-3'	Im- β -ImImPy- γ -ImPyPyHpPy
	406 β p) 5'-W G A G G C W-3'	Im- β -ImImPy- γ -ImPyPy- β -Py
	407 β) 5'-W G A G C G W-3'	Im- β -ImPyIm- γ -PyImPyHpPy
30	407 β p) 5'-W G A G C G W-3'	Im- β -ImPyIm- γ -PyImPy- β -Py
	408 β) 5'-W G A G C C W-3'	Im- β -ImPyPy- γ -ImImPyHpPy
	408 β p) 5'-W G A G C C W-3'	Im- β -ImPyPy- γ -ImImPy- β -Py

TABLE 57 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	409 β) 5'-W G A C T T W-3'	ImPyPyHpH β - γ -Py- β -ImH β Py
	409 β p) 5'-W G A C T T W-3'	ImPyPy- β -H β - γ -Py- β -ImH β Py
5	410 β) 5'-W G A C T A W-3'	ImPyPyHpPy- γ -H β - β -ImH β Py
	410 β p) 5'-W G A C T A W-3'	ImPyPy- β -Py- γ -H β - β -ImH β Py
	411 β) 5'-W G A C T G W-3'	ImPy- β -H β Im- γ -Py- β -ImH β Py
	412 β) 5'-W G A C T C W-3'	ImPyPyHpPy- γ -Im- β -ImH β Py
	412 β p) 5'-W G A C T C W-3'	ImPyPy- β -Py- γ -Im- β -ImH β Py
10	413 β) 5'-W G A C A T W-3'	ImPyPyPyHp- γ -Py- β -ImH β Py
	413 β p) 5'-W G A C A T W-3'	ImPyPy- β -H β - γ -Py- β -ImH β Py
	414 β) 5'-W G A C A A W-3'	ImPyPyPyPy- γ -H β - β -ImH β Py
	414 β p) 5'-W G A C A A W-3'	ImPyPy- β -Py- γ -H β - β -ImH β Py
	415 β) 5'-W G A C A G W-3'	ImPy- β -PyIm- γ -Py- β -ImH β Py
15	416 β) 5'-W G A C A C W-3'	ImPyPyPyPy- γ -Im- β -ImH β Py
	416 β p) 5'-W G A C A C W-3'	ImPyPy- β -Py- γ -Im- β -ImH β Py
	417 β) 5'-W G A C G T W-3'	ImPy- β -ImH β - γ -Py- β -ImH β Py
	418 β) 5'-W G A C G A W-3'	ImPy- β -ImPy- γ -H β - β -ImH β Py
	419 β) 5'-W G A C C T W-3'	Im- β -PyPyHp- γ -PyImIm- β -Py
20	419 β p) 5'-W G A C C T W-3'	ImPyPyPyHp- γ -PyImIm- β -Py
	420 β) 5'-W G A C C A W-3'	Im- β -PyPyPy- γ -H β ImIm- β -Py
	420 β p) 5'-W G A C C A W-3'	ImPyPyPyPy- γ -H β ImIm- β -Py
	421 β) 5'-W G A C G G W-3'	ImPy- β -ImIm- γ -Py- β -ImH β Py
	422 β) 5'-W G A C G C W-3'	ImPy- β -ImPy- γ -Im- β -ImH β Py
25	423 β) 5'-W G A C C G W-3'	ImPy- β -PyIm- γ -PyImIm- β -Py
	424 β) 5'-W G A C C C W-3'	ImPyPyPyPy- γ -ImImIm- β -Py
	424 β p) 5'-W G A C C C W-3'	Im- β -PyPyPy- γ -ImImIm- β -Py

TABLE 58: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCWNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	425 β) 5'-W G C T T T W-3'	ImPyH _p H _p H _p - γ -PyPy- β -ImPy
	425 β p) 5'-W G C T T T W-3'	ImPy- β -H _p H _p - γ -PyPy- β -ImPy
	426 β) 5'-W G C T T A W-3'	ImPyH _p H _p Py- γ -H _p Py- β -ImPy
	426 β p) 5'-W G C T T A W-3'	ImPy- β -H _p Py- γ -H _p Py- β -ImPy
10	427 β) 5'-W G C T T G W-3'	ImPy- β -H _p Im- γ -PyPy- β -ImPy
	428 β) 5'-W G C T T C W-3'	ImPyH _p H _p Py- γ -ImPy- β -ImPy
	428 β p) 5'-W G C T T C W-3'	ImPy- β -H _p Py- γ -ImPy- β -ImPy
	429 β) 5'-W G C T A T W-3'	ImPyH _p PyH _p - γ -PyH _p - β -ImPy
	429 β p) 5'-W G C T A T W-3'	ImPy- β -PyH _p - γ -PyH _p - β -ImPy
15	430 β) 5'-W G C T A A W-3'	ImPyH _p PyPy- γ -H _p Hp- β -ImPy
	430 β p) 5'-W G C T A A W-3'	ImPy- β -PyPy- γ -H _p Hp- β -ImPy
	431 β) 5'-W G C T A G W-3'	ImPy- β -PyIm- γ -PyH _p - β -ImPy
	432 β) 5'-W G C T A C W-3'	ImPyH _p PyPy- γ -ImH _p - β -ImPy
	432 β p) 5'-W G C T A C W-3'	ImPy- β -PyPy- γ -ImH _p - β -ImPy
	433 β) 5'-W G C T G T W-3'	ImPy- β -ImH _p - γ -PyPy- β -ImPy
	434 β) 5'-W G C T G A W-3'	ImPy- β -ImPy- γ -H _p Py- β -ImPy
20	435 β) 5'-W G C T G G W-3'	ImPy- β -ImIm- γ -PyPy- β -ImPy
	436 β) 5'-W G C T G C W-3'	ImPy- β -ImPy- γ -ImPy- β -ImPy
	437 β) 5'-W G C T C T W-3'	ImPyH _p PyH _p - γ -PyIm- β -ImPy
	437 β p) 5'-W G C T C T W-3'	ImPy- β -PyH _p - γ -PyIm- β -ImPy
	438 β) 5'-W G C T C A W-3'	ImPyH _p PyPy- γ -H _p Im- β -ImPy
25	438 β p) 5'-W G C T C A W-3'	ImPy- β -PyPy- γ -H _p Im- β -ImPy
	439 β) 5'-W G C T C G W-3'	ImPy- β -PyIm- γ -PyIm- β -ImPy
	440 β) 5'-W G C T C C W-3'	ImPyH _p PyPy- γ -ImIm- β -ImPy
	440 β p) 5'-W G C T C C W-3'	ImPy- β -PyPy- γ -ImIm- β -ImPy
	441 β) 5'-W G C A T T W-3'	ImPyPyH _p H _p - γ -PyPy- β -ImPy
30	441 β p) 5'-W G C A T T W-3'	ImPy- β -H _p H _p - γ -PyPy- β -ImPy
	442 β) 5'-W G C A T A W-3'	ImPyPyH _p Py- γ -H _p Py- β -ImPy
	442 β p) 5'-W G C A T A W-3'	ImPy- β -H _p Py- γ -H _p Py- β -ImPy
	443 β) 5'-W G C A T G W-3'	ImPy- β -H _p Im- γ -PyPy- β -ImPy

TABLE 58 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCWNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	444 β) 5'-W G C A T C W-3'	ImPyPyHpPy- γ -ImPy- β -ImPy
	444 β p) 5'-W G C A T C W-3'	ImPy- β -HpPy- γ -ImPy- β -ImPy
5	445 β) 5'-W G C A A T W-3'	ImPyPyPyHp- γ -PyHp- β -ImPy
	445 β p) 5'-W G C A A T W-3'	ImPy- β -PyHp- γ -PyHp- β -ImPy
	446 β) 5'-W G C A A A W-3'	ImPyPyPyPy- γ -HpHp- β -ImPy
	446 β p) 5'-W G C A A A W-3'	ImPy- β -PyPy- γ -HpHp- β -ImPy
	447 β) 5'-W G C A A G W-3'	ImPy- β -PyIm- γ -PyHp- β -ImPy
10	448 β) 5'-W G C A A C W-3'	ImPyPyPyPy- γ -ImHp- β -ImPy
	448 β p) 5'-W G C A A C W-3'	ImPy- β -PyPy- γ -ImHp- β -ImPy
	449 β) 5'-W G C A G T W-3'	ImPy- β -ImHp- γ -PyPy- β -ImPy
	450 β) 5'-W G C A G A W-3'	ImPy- β -ImPy- γ -HpPy- β -ImPy
	451 β) 5'-W G C A G G W-3'	ImPy- β -ImIm- γ -PyPy- β -ImPy
15	452 β) 5'-W G C A G C W-3'	ImPy- β -ImPy- γ -ImPy- β -ImPy
	453 β) 5'-W G C A C T W-3'	ImPyPyPyHp- γ -PyIm- β -ImPy
	453 β p) 5'-W G C A C T W-3'	ImPy- β -PyHp- γ -PyIm- β -ImPy
	454 β) 5'-W G C A C A W-3'	ImPyPyPyPy- γ -HpIm- β -ImPy
	454 β p) 5'-W G C A C A W-3'	ImPy- β -PyPy- γ -HpIm- β -ImPy
20	455 β) 5'-W G C A C G W-3'	ImPy- β -PyIm- γ -PyIm- β -ImPy
	456 β) 5'-W G C A C C W-3'	ImPyPyPyPy- γ -ImIm- β -ImPy
	456 β p) 5'-W G C A C C W-3'	ImPy- β -PyPy- γ -ImIm- β -ImPy

TABLE 59: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	457 β) 5'-W G C G T T W-3'	Im- β -ImHpHp- γ -PyPy- β -ImPy
	458 β) 5'-W G C G T A W-3'	Im- β -ImHpPy- γ -HpPy- β -ImPy
	459 β) 5'-W G C G T G W-3'	Im- β -ImHpIm- γ -PyPy- β -ImPy
	460 β) 5'-W G C G T C W-3'	Im- β -ImHpPy- γ -ImPy- β -ImPy
	461 β) 5'-W G C G A T W-3'	Im- β -ImPyHp- γ -PyHp- β -ImPy
	462 β) 5'-W G C G A A W-3'	Im- β -ImPyPy- γ -HpHp- β -ImPy
10	463 β) 5'-W G C G A G W-3'	Im- β -ImPyIm- γ -PyHp- β -ImPy
	464 β) 5'-W G C G A C W-3'	Im- β -ImPyPy- γ -ImHp- β -ImPy
	465 β) 5'-W G C G G T W-3'	Im- β -ImImHp- γ -PyPy- β -ImPy
	466 β) 5'-W G C G G A W-3'	Im- β -ImImPy- γ -HpPy- β -ImPy
	467 β) 5'-W G C G C T W-3'	Im- β -ImPyHp- γ -PyIm- β -ImPy
15	468 β) 5'-W G C G C A W-3'	Im- β -ImPyPy- γ -HpIm- β -ImPy
	469 β) 5'-W G C C T T W-3'	ImPyPyHpHp- γ -Py- β -ImImPy
	469 β p) 5'-W G C C T T W-3'	ImPyPy- β -Hp- γ -Py- β -ImImPy
	470 β) 5'-W G C C T A W-3'	ImPyPyHpPy- γ -Hp- β -ImImPy
	470 β p) 5'-W G C C T A W-3'	ImPyPy- β -Py- γ -Hp- β -ImImPy
20	471 β) 5'-W G C C T G W-3'	ImPy- β -HpIm- γ -Py- β -ImImPy
	472 β) 5'-W G C C T C W-3'	ImPyPyHpPy- γ -Im- β -ImImPy
	472 β p) 5'-W G C C T C W-3'	ImPyPy- β -Py- γ -Im- β -ImImPy
	473 β) 5'-W G C C A T W-3'	ImPyPyPyHp- γ -Py- β -ImImPy
	473 β p) 5'-W G C C A T W-3'	ImPyPy- β -Hp- γ -Py- β -ImImPy
25	474 β) 5'-W G C C A A W-3'	ImPyPyPyPy- γ -Hp- β -ImImPy
	474 β p) 5'-W G C C A A W-3'	ImPyPy- β -Py- γ -Hp- β -ImImPy
	475 β) 5'-W G C C A G W-3'	ImPy- β -PyIm- γ -Py- β -ImImPy
	476 β) 5'-W G C C A C W-3'	ImPyPyPyPy- γ -Im- β -ImImPy
	476 β p) 5'-W G C C A C W-3'	ImPyPy- β -Py- γ -Im- β -ImImPy
30	477 β) 5'-W G C C G T W-3'	ImPy- β -ImHp- γ -Py- β -ImImPy
	478 β) 5'-W G C C G A W-3'	ImPy- β -ImPy- γ -Hp- β -ImImPy

-89-

TABLE 59 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WGCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
G25 β)	5'-W G C G G G W-3'	Im- β -ImImIm- γ -PyPy- β -ImPy
G26 β)	5'-W G C G G C W-3'	Im- β -ImImPy- γ -ImPy- β -ImPy
5 G27 β)	5'-W G C G C G W-3'	Im- β -ImPyIm- γ -PyIm- β -ImPy
G28 β)	5'-W G C G C C W-3'	Im- β -ImPyPy- γ -ImIm- β -ImPy
G29 β)	5'-W G C C G G W-3'	ImPy- β -ImIm- γ -Py- β -ImImPy
G30 β)	5'-W G C C G C W-3'	ImPy- β -ImPy- γ -Im- β -ImImPy
G31 β)	5'-W G C C C G W-3'	ImPy- β -PyIm- γ -PyImImImPy

10

TABLE 60: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	481 β) 5'-W C G T T T W-3'	PyImHpHpH β - γ -PyPy- β -PyIm
	481 β p) 5'-W C G T T T W-3'	PyIm- β -HpH β - γ -PyPy- β -PyIm
	482 β) 5'-W C G T T A W-3'	PyImHpH β Py- γ -HpPy- β -PyIm
	482 β p) 5'-W C G T T A W-3'	PyIm- β -HpPy- γ -HpPy- β -PyIm
	483 β) 5'-W C G T T G W-3'	PyIm- β -HpIm- γ -PyPy- β -PyIm
10	484 β) 5'-W C G T T C W-3'	PyImHpH β Py- γ -ImPy- β -PyIm
	484 β p) 5'-W C G T T C W-3'	PyIm- β -HpPy- γ -ImPy- β -PyIm
	485 β) 5'-W C G T A T W-3'	PyImHpPyH β - γ -PyH β - β -PyIm
	485 β p) 5'-W C G T A T W-3'	PyIm- β -PyH β - γ -PyH β - β -PyIm
	486 β) 5'-W C G T A A W-3'	PyImHpPyPy- γ -HpH β - β -PyIm
	486 β p) 5'-W C G T A A W-3'	PyIm- β -PyPy- γ -HpH β - β -PyIm
15	487 β) 5'-W C G T A G W-3'	PyIm- β -PyIm- γ -PyH β - β -PyIm
	488 β) 5'-W C G T A C W-3'	PyImHpPyPy- γ -ImH β - β -PyIm
	488 β p) 5'-W C G T A C W-3'	PyIm- β -PyPy- γ -ImH β - β -PyIm
	489 β) 5'-W C G T G T W-3'	PyIm- β -ImH β - γ -PyPy- β -PyIm
	490 β) 5'-W C G T G A W-3'	PyIm- β -ImPy- γ -HpPy- β -PyIm
20	491 β) 5'-W C G T G G W-3'	PyIm- β -ImIm- γ -PyPy- β -PyIm
	492 β) 5'-W C G T G C W-3'	PyIm- β -ImPy- γ -ImPy- β -PyIm
	493 β) 5'-W C G T C T W-3'	PyImHpPyH β - γ -PyIm- β -PyIm
	493 β p) 5'-W C G T C T W-3'	PyIm- β -PyH β - γ -PyIm- β -PyIm
	494 β) 5'-W C G T C A W-3'	PyImHpPyPy- γ -HpIm- β -PyIm
25	494 β p) 5'-W C G T C A W-3'	PyIm- β -PyPy- γ -HpIm- β -PyIm
	495 β) 5'-W C G T C G W-3'	PyIm- β -PyIm- γ -PyIm- β -PyIm
	496 β) 5'-W C G T C C W-3'	PyImHpPyPy- γ -ImIm- β -PyIm
	496 β p) 5'-W C G T C C W-3'	PyIm- β -PyPy- γ -ImIm- β -PyIm
	497 β) 5'-W C G A T T W-3'	PyImPyH β Py- γ -PyPy- β -PyIm
30	497 β p) 5'-W C G A T T W-3'	PyIm- β -HpH β - γ -PyPy- β -PyIm
	498 β) 5'-W C G A T A W-3'	PyImPyH β Py- γ -HpPy- β -PyIm
	498 β p) 5'-W C G A T A W-3'	PyIm- β -HpPy- γ -HpPy- β -PyIm

TABLE 60 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGWNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	499 β) 5'-W C G A T G W-3'	PyIm- β -HpIm- γ -PyPy- β -PyIm
	500 β) 5'-W C G A T C W-3'	PyImPyHpPy- γ -ImPy- β -PyIm
5	500 β p) 5'-W C G A T C W-3'	PyIm- β -HpPy- γ -ImPy- β -PyIm
	501 β) 5'-W C G A A T W-3'	PyImPyHp- γ -PyHp- β -PyIm
	501 β p) 5'-W C G A A T W-3'	PyIm- β -PyHp- γ -PyHp- β -PyIm
	502 β) 5'-W C G A A A W-3'	PyImPyPyPy- γ -HpHp- β -PyIm
	502 β p) 5'-W C G A A A W-3'	PyIm- β -PyPy- γ -HpHp- β -PyIm
10	503 β) 5'-W C G A A G W-3'	PyIm- β -PyIm- γ -PyHp- β -PyIm
	504 β) 5'-W C G A A C W-3'	PyImPyPyPy- γ -ImHp- β -PyIm
	504 β p) 5'-W C G A A C W-3'	PyIm- β -PyPy- γ -ImHp- β -PyIm
	505 β) 5'-W C G A G T W-3'	PyIm- β -ImHp- γ -PyPy- β -PyIm
	506 β) 5'-W C G A G A W-3'	PyIm- β -ImPy- γ -HpPy- β -PyIm
15	507 β) 5'-W C G A G G W-3'	PyIm- β -ImIm- γ -PyPy- β -PyIm
	508 β) 5'-W C G A G C W-3'	PyIm- β -ImPy- γ -ImPy- β -PyIm
	509 β) 5'-W C G A C T W-3'	PyImPyPyHp- γ -PyIm- β -PyIm
	509 β p) 5'-W C G A C T W-3'	PyIm- β -PyHp- γ -PyIm- β -PyIm
	510 β) 5'-W C G A C A W-3'	PyImPyPyPy- γ -HpIm- β -PyIm
20	510 β p) 5'-W C G A C A W-3'	PyIm- β -PyPy- γ -HpIm- β -PyIm
	511 β) 5'-W C G A C G W-3'	PyIm- β -PyIm- γ -PyIm- β -PyIm
	512 β) 5'-W C G A C C W-3'	PyImPyPyPy- γ -ImIm- β -PyIm
	512 β p) 5'-W C G A C C W-3'	PyIm- β -PyPy- γ -ImIm- β -PyIm

TABLE 61: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	513 β) 5'-W C G G T T W-3'	PyImIm- β -Hp- γ -PyPy- β -PyIm
	514 β) 5'-W C G G T A W-3'	PyImIm- β -Py- γ -HpPy- β -PyIm
	515 β) 5'-W C G G T G W-3'	PyImIm- β -Im- γ -PyPy- β -PyIm
	516 β) 5'-W C G G T C W-3'	PyImIm- β -Py- γ -ImPy- β -PyIm
	517 β) 5'-W C G G A T W-3'	PyImIm- β -Hp- γ -PyHp- β -PyIm
	518 β) 5'-W C G G A A W-3'	PyImIm- β -Py- γ -HpHp- β -PyIm
10	519 β) 5'-W C G G A G W-3'	PyImIm- β -Im- γ -PyHp- β -PyIm
	520 β) 5'-W C G G A C W-3'	PyImIm- β -Py- γ -ImHp- β -PyIm
	521 β) 5'-W C G G G T W-3'	PyImImImHp- γ -PyPy- β -PyIm
	522 β) 5'-W C G G G A W-3'	PyImImImPy- γ -HpPy- β -PyIm
	523 β) 5'-W C G G C T W-3'	PyImIm- β -Hp- γ -PyIm- β -PyIm
15	524 β) 5'-W C G G C A W-3'	PyImIm- β -Py- γ -HpIm- β -PyIm
	525 β) 5'-W C G C T T W-3'	PyImPyHpHp- γ -Py- β -ImPyIm
	525 β p) 5'-W C G C T T W-3'	PyImPy- β -Hp- γ -Py- β -ImPyIm
	526 β) 5'-W C G C T A W-3'	PyImPyHpPy- γ -Hp- β -ImPyIm
	526 β p) 5'-W C G C T A W-3'	PyImPy- β -Py- γ -Hp- β -ImPyIm
20	527 β) 5'-W C G C T G W-3'	PyIm- β -HpIm- γ -Py- β -ImPyIm
	528 β) 5'-W C G C T C W-3'	PyImPyHpPy- γ -Im- β -ImPyIm
	528 β p) 5'-W C G C T C W-3'	PyImPy- β -Py- γ -Im- β -ImPyIm
	529 β) 5'-W C G C A T W-3'	PyImPyPyHp- γ -Py- β -ImPyIm
	529 β p) 5'-W C G C A T W-3'	PyImPy- β -Hp- γ -Py- β -ImPyIm
25	530 β) 5'-W C G C A A W-3'	PyImPyPyPy- γ -Hp- β -ImPyIm
	530 β p) 5'-W C G C A A W-3'	PyImPy- β -Py- γ -Hp- β -ImPyIm
	531 β) 5'-W C G C A G W-3'	PyIm- β -PyIm- γ -Py- β -ImPyIm
	532 β) 5'-W C G C A C W-3'	PyImPyPyPy- γ -Im- β -ImPyIm
	532 β p) 5'-W C G C A C W-3'	PyImPy- β -Py- γ -Im- β -ImPyIm
30	533 β) 5'-W C G C G T W-3'	PyIm- β -ImHp- γ -Py- β -ImPyIm
	534 β) 5'-W C G C G A W-3'	PyIm- β -ImPy- γ -Hp- β -ImPyIm

TABLE 61 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCGSNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	535 β) 5'-W C G C C T W-3'	PyImPyPyHp- γ -PyImIm- β -Im
5	536 β) 5'-W C G C C A W-3'	PyImPyPyPy- γ -HpImIm- β -Im
	G33 β) 5'-W C G G G G W-3'	PyImImImIm- γ -PyPy- β -PyIm
	G34 β) 5'-W C G G G C W-3'	PyImImImPy- γ -ImPy- β -PyIm
	G35 β) 5'-W C G G C G W-3'	PyImIm- β -Im- γ -PyIm- β -PyIm
	G36 β) 5'-W C G G C C W-3'	PyImIm- β -Py- γ -ImIm- β -PyIm
10	G37 β) 5'-W C G C G G W-3'	PyIm- β -ImIm- γ -Py- β -ImPyIm
	G38 β) 5'-W C G C G C W-3'	PyIm- β -ImPy- γ -Im- β -ImPyIm
	G39 β) 5'-W C G C C G W-3'	PyIm- β -PyIm- γ -PyImIm- β -Im
	G40 β) 5'-W C G C C C W-3'	PyImPyPyPy- γ -ImImIm- β -Im

TABLE 62: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	537 β) 5'-W C T T T T W-3'	PyHpHpHpHp- γ -PyPy- β -PyIm
	537 β p) 5'-W C T T T T W-3'	PyHp- β -HpHp- γ -PyPy- β -PyIm
	538 β) 5'-W C T T T A W-3'	PyHpHpHpPy- γ -HpPy- β -PyIm
	538 β p) 5'-W C T T T A W-3'	PyHp- β -HpPy- γ -HpPy- β -PyIm
	539 β) 5'-W C T T T G W-3'	PyHp- β -HpIm- γ -PyPy- β -PyIm
10	540 β) 5'-W C T T T C W-3'	PyHpHpHpPy- γ -ImPy- β -PyIm
	540 β p) 5'-W C T T T C W-3'	PyHp- β -HpPy- γ -ImPy- β -PyIm
	541 β) 5'-W C T T A T W-3'	PyHpHpPyHp- γ -PyHp- β -PyIm
	541 β p) 5'-W C T T A T W-3'	PyHp- β -PyHp- γ -PyHp- β -PyIm
	542 β) 5'-W C T T A A W-3'	PyHpHpPyPy- γ -HpHp- β -PyIm
	542 β p) 5'-W C T T A A W-3'	PyHp- β -PyPy- γ -HpHp- β -PyIm
15	543 β) 5'-W C T T A G W-3'	PyHp- β -PyIm- γ -PyHp- β -PyIm
	544 β) 5'-W C T T A C W-3'	PyHpHpPyPy- γ -ImHp- β -PyIm
	544 β p) 5'-W C T T A C W-3'	PyHp- β -PyPy- γ -ImHp- β -PyIm
	545 β) 5'-W C T T G T W-3'	PyHp- β -ImHp- γ -PyPy- β -PyIm
	546 β) 5'-W C T T G A W-3'	PyHp- β -ImPy- γ -HpPy- β -PyIm
20	547 β) 5'-W C T T G G W-3'	PyHp- β -ImIm- γ -PyPy- β -PyIm
	548 β) 5'-W C T T G C W-3'	PyHp- β -ImPy- γ -ImPy- β -PyIm
	549 β) 5'-W C T T C T W-3'	PyHpHpPyHp- γ -PyIm- β -PyIm
	549 β p) 5'-W C T T C T W-3'	PyHp- β -PyHp- γ -PyIm- β -PyIm
	550 β) 5'-W C T T C A W-3'	PyHpHpPyPy- γ -HpIm- β -PyIm
25	550 β p) 5'-W C T T C A W-3'	PyHp- β -PyPy- γ -HpIm- β -PyIm
	551 β) 5'-W C T T C G W-3'	PyHp- β -PyIm- γ -PyIm- β -PyIm
	552 β) 5'-W C T T C C W-3'	PyHpHpPyPy- γ -ImIm- β -PyIm
	552 β p) 5'-W C T T C C W-3'	PyHp- β -PyPy- γ -ImIm- β -PyIm
	553 β) 5'-W C T A T T W-3'	PyHpPyHpHp- γ -PyPy- β -PyIm
30	553 β p) 5'-W C T A T T W-3'	PyHp- β -HpHp- γ -PyPy- β -PyIm
	554 β) 5'-W C T A T A W-3'	PyHpPyHpPy- γ -HpPy- β -PyIm

TABLE 62 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	554 β p) 5'-W C T A T A W-3'	PyHp- β -HpPy- γ -HpPy- β -PyIm
5	555 β) 5'-W C T A T G W-3'	PyHp- β -HpIm- γ -PyPy- β -PyIm
	556 β) 5'-W C T A T C W-3'	PyHpPyHpPy- γ -ImPy- β -PyIm
	556 β p) 5'-W C T A T C W-3'	PyHp- β -HpPy- γ -ImPy- β -PyIm
	557 β) 5'-W C T A A T W-3'	PyHpPyPyHp- γ -PyHp- β -PyIm
	557 β p) 5'-W C T A A T W-3'	PyHp- β -PyHp- γ -PyHp- β -PyIm
10	558 β) 5'-W C T A A A W-3'	PyHpPyPyPy- γ -HpHp- β -PyIm
	558 β p) 5'-W C T A A A W-3'	PyHp- β -PyPy- γ -HpHp- β -PyIm
	559 β) 5'-W C T A A G W-3'	PyHp- β -PyIm- γ -PyHp- β -PyIm
	560 β) 5'-W C T A A C W-3'	PyHpPyPyPy- γ -ImHp- β -PyIm
	560 β p) 5'-W C T A A C W-3'	PyHp- β -PyPy- γ -ImHp- β -PyIm
15	561 β) 5'-W C T A G T W-3'	PyHp- β -ImHp- γ -PyPy- β -PyIm
	562 β) 5'-W C T A G A W-3'	PyHp- β -ImPy- γ -HpPy- β -PyIm
	563 β) 5'-W C T A G G W-3'	PyHp- β -ImIm- γ -PyPy- β -PyIm
	564 β) 5'-W C T A G C W-3'	PyHp- β -ImPy- γ -ImPy- β -PyIm
	565 β) 5'-W C T A C T W-3'	PyHpPyPyHp- γ -PyIm- β -PyIm
20	565 β p) 5'-W C T A C T W-3'	PyHp- β -PyHp- γ -PyIm- β -PyIm
	566 β) 5'-W C T A C A W-3'	PyHpPyPyPy- γ -HpIm- β -PyIm
	566 β p) 5'-W C T A C A W-3'	PyHp- β -PyPy- γ -HpIm- β -PyIm
	567 β) 5'-W C T A C G W-3'	PyHp- β -PyIm- γ -PyIm- β -PyIm
	568 β) 5'-W C T A C C W-3'	PyHpPyPyPy- γ -ImIm- β -PyIm
25	568 β p) 5'-W C T A C C W-3'	PyHp- β -PyPy- γ -ImIm- β -PyIm

TABLE 63: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	569 β) 5'-W C T G T T W-3'	Py- β -ImHpHp- γ -PyPy- β -PyIm
	570 β) 5'-W C T G T A W-3'	Py- β -ImHpPy- γ -HpPy- β -PyIm
	571 β) 5'-W C T G T G W-3'	Py- β -ImHpIm- γ -PyPy- β -PyIm
	572 β) 5'-W C T G T C W-3'	Py- β -ImHpPy- γ -ImPy- β -PyIm
	573 β) 5'-W C T G A T W-3'	Py- β -ImPyHp- γ -PyHp- β -PyIm
	574 β) 5'-W C T G A A W-3'	Py- β -ImPyPy- γ -HpHp- β -PyIm
10	575 β) 5'-W C T G A G W-3'	Py- β -ImPyIm- γ -PyHp- β -PyIm
	576 β) 5'-W C T G A C W-3'	Py- β -ImPyPy- γ -ImHp- β -PyIm
	577 β) 5'-W C T G G T W-3'	Py- β -ImImHp- γ -PyPy- β -PyIm
	578 β) 5'-W C T G G A W-3'	Py- β -ImImPy- γ -HpPy- β -PyIm
	579 β) 5'-W C T G C T W-3'	Py- β -ImPyHp- γ -PyIm- β -PyIm
15	580 β) 5'-W C T G C A W-3'	Py- β -ImPyPy- γ -HpIm- β -PyIm
	581 β) 5'-W C T G G G W-3'	Py- β -ImImIm- γ -PyPy- β -PyIm
	582 β) 5'-W C T G G C W-3'	Py- β -ImImPy- γ -ImPy- β -PyIm
	583 β) 5'-W C T G C G W-3'	Py- β -ImPyIm- γ -PyIm- β -PyIm
	584 β) 5'-W C T G C C W-3'	Py- β -ImPyPy- γ -ImIm- β -PyIm
20	585 β) 5'-W C T C T T W-3'	PyHpPyHpHp- γ -Py- β -ImPyIm
	585 β p) 5'-W C T C T T W-3'	PyHpPy- β -Hp- γ -Py- β -ImPyIm
	586 β) 5'-W C T C T A W-3'	PyHpPyHpPy- γ -Hp- β -ImPyIm
	586 β p) 5'-W C T C T A W-3'	PyHpPy- β -Py- γ -Hp- β -ImPyIm
	587 β) 5'-W C T C T G W-3'	PyHp- β -HpIm- γ -Py- β -ImPyIm
25	588 β) 5'-W C T C T C W-3'	PyHpPyHpPy- γ -Im- β -ImPyIm
	588 β p) 5'-W C T C T C W-3'	PyHpPy- β -Py- γ -Im- β -ImPyIm
	589 β) 5'-W C T C A T W-3'	PyHpPyPyHp- γ -Py- β -ImPyIm
	589 β p) 5'-W C T C A T W-3'	PyHpPy- β -Hp- γ -Py- β -ImPyIm
	590 β) 5'-W C T C A A W-3'	PyHpPyPyPy- γ -Hp- β -ImPyIm
30	590 β p) 5'-W C T C A A W-3'	PyHpPy- β -Py- γ -Hp- β -ImPyIm
	591 β) 5'-W C T C A G W-3'	PyHp- β -PyIm- γ -Py- β -ImPyIm

TABLE 63 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCTSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	592 β) 5'-W C T C A C W-3'	PyHpPyPyPy- γ -Im- β -ImPyIm
	592 β p) 5'-W C T C A C W-3'	PyHpPy- β -Py- γ -Im- β -ImPyIm
5	593 β) 5'-W C T C G T W-3'	PyHp- β -ImHp- γ -Py- β -ImPyIm
	594 β) 5'-W C T C G A W-3'	PyHp- β -ImPy- γ -Hp- β -ImPyIm
	595 β) 5'-W C T C C T W-3'	PyHpPyPyHp- γ -PyImIm- β -Im
	595 β p) 5'-W C T C C T W-3'	Py- β -PyPyHp- γ -PyImIm- β -Im
	596 β) 5'-W C T C C A W-3'	PyHpPyPyPy- γ -HpImIm- β -Im
10	596 β p) 5'-W C T C C A W-3'	Py- β -PyPyPy- γ -HpImIm- β -Im
	597 β) 5'-W C T C G G W-3'	PyHp- β -ImIm- γ -Py- β -ImPyIm
	598 β) 5'-W C T C G C W-3'	PyHp- β -ImPy- γ -Im- β -ImPyIm
	599 β) 5'-W C T C C G W-3'	PyHp- β -PyIm- γ -PyImIm- β -Im
	600 β) 5'-W C T C C C W-3'	PyHpPyPyPy- γ -ImImIm- β -Im
15	600 β p) 5'-W C T C C C W-3'	Py- β -PyPyPy- γ -ImImIm- β -Im

TABLE 64: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	601 β) 5'-W C A T T T W-3'	PyPyH _p H _p H _p - γ -PyPy- β -H _p I _m
	601 β p) 5'-W C A T T T W-3'	PyPy- β -H _p H _p - γ -PyPy- β -H _p I _m
	602 β) 5'-W C A T T A W-3'	PyPyH _p H _p Py- γ -H _p Py- β -H _p I _m
	602 β p) 5'-W C A T T A W-3'	PyPy- β -H _p Py- γ -H _p Py- β -H _p I _m
10	603 β) 5'-W C A T T G W-3'	PyPy- β -H _p I _m - γ -PyPy- β -H _p I _m
	604 β) 5'-W C A T T C W-3'	PyPyH _p H _p Py- γ -I _m Py- β -H _p I _m
	604 β p) 5'-W C A T T C W-3'	PyPy- β -H _p Py- γ -I _m Py- β -H _p I _m
	605 β) 5'-W C A T A T W-3'	PyPyH _p PyH _p - γ -PyH _p - β -H _p I _m
	605 β p) 5'-W C A T A T W-3'	PyPy- β -PyH _p - γ -PyH _p - β -H _p I _m
15	606 β) 5'-W C A T A A W-3'	PyPyH _p PyPy- γ -H _p H _p - β -H _p I _m
	606 β p) 5'-W C A T A A W-3'	PyPy- β -PyPy- γ -H _p H _p - β -H _p I _m
	607 β) 5'-W C A T A G W-3'	PyPy- β -PyI _m - γ -PyH _p - β -H _p I _m
	608 β) 5'-W C A T A C W-3'	PyPyH _p PyPy- γ -I _m H _p - β -H _p I _m
	608 β p) 5'-W C A T A C W-3'	PyPy- β -PyPy- γ -I _m H _p - β -H _p I _m
20	609 β) 5'-W C A T G T W-3'	PyPy- β -I _m H _p - γ -PyPy- β -H _p I _m
	610 β) 5'-W C A T G A W-3'	PyPy- β -I _m Py- γ -H _p Py- β -H _p I _m
	611 β) 5'-W C A T G G W-3'	PyPy- β -I _m I _m - γ -PyPy- β -H _p I _m
	612 β) 5'-W C A T G C W-3'	PyPy- β -I _m Py- γ -I _m Py- β -H _p I _m
	613 β) 5'-W C A T C T W-3'	PyPyH _p PyH _p - γ -PyI _m - β -H _p I _m
	613 β p) 5'-W C A T C T W-3'	PyPy- β -PyH _p - γ -PyI _m - β -H _p I _m
25	614 β) 5'-W C A T C A W-3'	PyPyH _p PyPy- γ -H _p I _m - β -H _p I _m
	614 β p) 5'-W C A T C A W-3'	PyPy- β -PyPy- γ -H _p I _m - β -H _p I _m
	615 β) 5'-W C A T C G W-3'	PyPy- β -PyI _m - γ -PyI _m - β -H _p I _m
	616 β) 5'-W C A T C C W-3'	PyPyH _p PyPy- γ -I _m I _m - β -H _p I _m
	616 β p) 5'-W C A T C C W-3'	PyPy- β -PyPy- γ -I _m I _m - β -H _p I _m
30	617 β) 5'-W C A A T T W-3'	PyPyPyH _p H _p - γ -PyPy- β -H _p I _m
	617 β p) 5'-W C A A T T W-3'	PyPy- β -H _p H _p - γ -PyPy- β -H _p I _m
	618 β) 5'-W C A A T A W-3'	PyPyPyH _p Py- γ -H _p Py- β -H _p I _m
	618 β p) 5'-W C A A T A W-3'	PyPy- β -H _p Py- γ -H _p Py- β -H _p I _m

TABLE 64 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	619 β) 5'-W C A A T G W-3'	PyPy- β -HpIm- γ -PyPy- β -HpIm
	620 β) 5'-W C A A T C W-3'	PyPyPyHpPy- γ -ImPy- β -HpIm
5	620 β p) 5'-W C A A T C W-3'	PyPy- β -HpPy- γ -ImPy- β -HpIm
	621 β) 5'-W C A A A T W-3'	PyPyPyPyHp- γ -PyHp- β -HpIm
	621 β p) 5'-W C A A A T W-3'	PyPy- β -PyHp- γ -PyHp- β -HpIm
	622 β) 5'-W C A A A A W-3'	PyPyPyPyPy- γ -HpHp- β -HpIm
	622 β p) 5'-W C A A A A W-3'	PyPy- β -PyPy- γ -HpHp- β -HpIm
10	623 β) 5'-W C A A A G W-3'	PyPy- β -PyIm- γ -PyHp- β -HpIm
	624 β) 5'-W C A A A C W-3'	PyPyPyPyPy- γ -ImHp- β -HpIm
	624 β p) 5'-W C A A A C W-3'	PyPy- β -PyPy- γ -ImHp- β -HpIm
	625 β) 5'-W C A A G T W-3'	PyPy- β -ImHp- γ -PyPy- β -HpIm
	626 β) 5'-W C A A G A W-3'	PyPy- β -ImPy- γ -HpPy- β -HpIm
15	627 β) 5'-W C A A G G W-3'	PyPy- β -ImIm- γ -PyPy- β -HpIm
	628 β) 5'-W C A A G C W-3'	PyPy- β -ImPy- γ -ImPy- β -HpIm
	629 β) 5'-W C A A C T W-3'	PyPyPyPyHp- γ -PyIm- β -HpIm
	629 β p) 5'-W C A A C T W-3'	PyPy- β -PyHp- γ -PyIm- β -HpIm
	630 β) 5'-W C A A C A W-3'	PyPyPyPyPy- γ -HpIm- β -HpIm
20	630 β p) 5'-W C A A C A W-3'	PyPy- β -PyPy- γ -HpIm- β -HpIm
	631 β) 5'-W C A A C G W-3'	PyPy- β -PyIm- γ -PyIm- β -HpIm
	632 β) 5'-W C A A C C W-3'	PyPyPyPyPy- γ -ImIm- β -HpIm
	632 β p) 5'-W C A A C C W-3'	PyPy- β -PyPy- γ -ImIm- β -HpIm

-100-

TABLE 65: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	633 β) 5'-W C A G T T W-3'	Py- β -ImHpH β - γ -PyPy- β -HpIm
	634 β) 5'-W C A G T A W-3'	Py- β -ImHpPy- γ -HpPy- β -HpIm
	635 β) 5'-W C A G T G W-3'	Py- β -ImHpIm- γ -PyPy- β -HpIm
	636 β) 5'-W C A G T C W-3'	Py- β -ImHpPy- γ -ImPy- β -HpIm
	637 β) 5'-W C A G A T W-3'	Py- β -ImPyHp- γ -PyHp- β -HpIm
	638 β) 5'-W C A G A A W-3'	Py- β -ImPyPy- γ -HpHp- β -HpIm
10	639 β) 5'-W C A G A G W-3'	Py- β -ImPyIm- γ -PyHp- β -HpIm
	640 β) 5'-W C A G A C W-3'	Py- β -ImPyPy- γ -ImHp- β -HpIm
	641 β) 5'-W C A G G T W-3'	Py- β -ImImHp- γ -PyPy- β -HpIm
	642 β) 5'-W C A G G A W-3'	Py- β -ImImPy- γ -HpPy- β -HpIm
	643 β) 5'-W C A G C T W-3'	Py- β -ImPyHp- γ -PyIm- β -HpIm
15	644 β) 5'-W C A G C A W-3'	Py- β -ImPyPy- γ -HpIm- β -HpIm
	645 β) 5'-W C A G G G W-3'	Py- β -ImImIm- γ -PyPy- β -HpIm
	646 β) 5'-W C A G G C W-3'	Py- β -ImImPy- γ -ImPy- β -HpIm
	647 β) 5'-W C A G C G W-3'	Py- β -ImPyIm- γ -PyIm- β -HpIm
	648 β) 5'-W C A G C C W-3'	Py- β -ImPyPy- γ -ImIm- β -HpIm
20	649 β) 5'-W C A C T T W-3'	PyPyPyHpH β - γ -Py- β -ImHpIm
	649 β p) 5'-W C A C T T W-3'	PyPyPy- β -Hp- γ -Py- β -ImHpIm
	650 β) 5'-W C A C T A W-3'	PyPyPyHpPy- γ -Hp- β -ImHpIm
	650 β p) 5'-W C A C T A W-3'	PyPyPy- β -Py- γ -Hp- β -ImHpIm
	651 β) 5'-W C A C T G W-3'	PyPy- β -HpIm- γ -Py- β -ImHpIm
25	652 β) 5'-W C A C T C W-3'	PyPyPyHpPy- γ -Im- β -ImHpIm
	652 β p) 5'-W C A C T C W-3'	PyPyPy- β -Py- γ -Im- β -ImHpIm
	653 β) 5'-W C A C A T W-3'	PyPyPyPyHp- γ -Py- β -ImHpIm
	653 β p) 5'-W C A C A T W-3'	PyPyPy- β -Hp- γ -Py- β -ImHpIm
	654 β) 5'-W C A C A A W-3'	PyPyPyPyPy- γ -Hp- β -ImHpIm
30	654 β p) 5'-W C A C A A W-3'	PyPyPy- β -Py- γ -Hp- β -ImHpIm
	655 β) 5'-W C A C A G W-3'	PyPy- β -PyIm- γ -Py- β -ImHpIm

TABLE 65 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	656 β) 5'-W C A C A C W-3'	PyPyPyPyPy- γ -Im- β -ImHpIm
	656 β p) 5'-W C A C A C W-3'	PyPyPy- β -Py- γ -Im- β -ImHpIm
5	657 β) 5'-W C A C G T W-3'	PyPy- β -ImHp- γ -Py- β -ImHpIm
	658 β p) 5'-W C A C G A W-3'	PyPy- β -ImPy- γ -Hp- β -ImHpIm
	659 β) 5'-W C A C C T W-3'	PyPyPyPyHp- γ -PyImIm- β -Im
	659 β p) 5'-W C A C C T W-3'	Py- β -PyPyHp- γ -PyImIm- β -Im
10	660 β) 5'-W C A C C A W-3'	PyPyPyPyPy- γ -HpImIm- β -Im
	660 β p) 5'-W C A C C A W-3'	Py- β -PyPyPy- γ -HpImIm- β -Im
	661 β) 5'-W C A C G G W-3'	PyPy- β -ImIm- γ -Py- β -ImHpIm
	662 β) 5'-W C A C G C W-3'	PyPy- β -ImPy- γ -Im- β -ImHpIm
	663 β) 5'-W C A C C G W-3'	PyPy- β -PyIm- γ -PyImIm- β -Im
	664 β) 5'-W C A C C C W-3'	PyPyPyPyPy- γ -ImImIm- β -Im
15	664 β p) 5'-W C A C C C W-3'	Py- β -PyPyPy- γ -ImImIm- β -Im

TABLE 66: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	665 β) 5'-W C C T T T W-3'	PyPyH _p H _p H _p - γ -PyPy- β -ImIm
	665 β p) 5'-W C C T T T W-3'	PyPy- β -H _p H _p - γ -PyPy- β -ImIm
	666 β) 5'-W C C T T A W-3'	PyPyH _p H _p Py- γ -H _p Py- β -ImIm
	666 β p) 5'-W C C T T A W-3'	PyPy- β -H _p Py- γ -H _p Py- β -ImIm
	667 β) 5'-W C C T T G W-3'	PyPy- β -H _p Im- γ -PyPy- β -ImIm
	668 β) 5'-W C C T T C W-3'	PyPyH _p H _p Py- γ -ImPy- β -ImIm
10	668 β p) 5'-W C C T T C W-3'	PyPy- β -H _p Py- γ -ImPy- β -ImIm
	669 β) 5'-W C C T A T W-3'	PyPyH _p PyH _p - γ -PyH _p - β -ImIm
	669 β p) 5'-W C C T A T W-3'	PyPy- β -PyH _p - γ -PyH _p - β -ImIm
	670 β) 5'-W C C T A A W-3'	PyPyH _p PyPy- γ -H _p H _p - β -ImIm
	670 β p) 5'-W C C T A A W-3'	PyPy- β -PyPy- γ -H _p H _p - β -ImIm
15	671 β) 5'-W C C T A G W-3'	PyPy- β -PyIm- γ -PyH _p - β -ImIm
	672 β) 5'-W C C T A C W-3'	PyPyH _p PyPy- γ -ImH _p - β -ImIm
	672 β p) 5'-W C C T A C W-3'	PyPy- β -PyPy- γ -ImH _p - β -ImIm
	673 β) 5'-W C C T G T W-3'	PyPy- β -ImH _p - γ -PyPy- β -ImIm
	674 β) 5'-W C C T G A W-3'	PyPy- β -ImPy- γ -H _p Py- β -ImIm
20	675 β) 5'-W C C T G G W-3'	PyPy- β -ImIm- γ -PyPy- β -ImIm
	676 β) 5'-W C C T G C W-3'	PyPy- β -ImPy- γ -ImPy- β -ImIm
	677 β) 5'-W C C T C T W-3'	PyPyH _p PyH _p - γ -PyIm- β -ImIm
	677 β p) 5'-W C C T C T W-3'	PyPy- β -PyH _p - γ -PyIm- β -ImIm
	678 β) 5'-W C C T C A W-3'	PyPyH _p PyPy- γ -H _p Im- β -ImIm
25	678 β p) 5'-W C C T C A W-3'	PyPy- β -PyPy- γ -H _p Im- β -ImIm
	679 β) 5'-W C C T C G W-3'	PyPy- β -PyIm- γ -PyIm- β -ImIm
	680 β) 5'-W C C T C C W-3'	PyPyH _p PyPy- γ -ImIm- β -ImIm
	680 β p) 5'-W C C T C C W-3'	PyPy- β -PyPy- γ -ImIm- β -ImIm
	681 β) 5'-W C C A T T W-3'	PyPyPyH _p H _p - γ -PyPy- β -ImIm
30	681 β p) 5'-W C C A T T W-3'	PyPy- β -H _p H _p - γ -PyPy- β -ImIm
	682 β) 5'-W C C A T A W-3'	PyPyPyH _p Py- γ -H _p Py- β -ImIm
	682 β p) 5'-W C C A T A W-3'	PyPy- β -H _p Py- γ -H _p Py- β -ImIm

TABLE 66: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	683 β) 5'-W C C A T G W-3'	PyPy- β -HpIm- γ -PyPy- β -ImIm
5	684 β) 5'-W C C A T C W-3'	PyPyPyHpPy- γ -ImPy- β -ImIm
	684 β p) 5'-W C C A T C W-3'	PyPy- β -HpPy- γ -ImPy- β -ImIm
	685 β) 5'-W C C A A T W-3'	PyPyPyPyHp- γ -PyHp- β -ImIm
	685 β p) 5'-W C C A A T W-3'	PyPy- β -PyHp- γ -PyHp- β -ImIm
	686 β) 5'-W C C A A A W-3'	PyPyPyPyPy- γ -HpHp- β -ImIm
10	686 β p) 5'-W C C A A A W-3'	PyPy- β -PyPy- γ -HpHp- β -ImIm
	687 β) 5'-W C C A A G W-3'	PyPy- β -PyIm- γ -PyHp- β -ImIm
	688 β) 5'-W C C A A C W-3'	PyPyPyPyPy- γ -ImHp- β -ImIm
	688 β p) 5'-W C C A A C W-3'	PyPy- β -PyPy- γ -ImHp- β -ImIm
	689 β) 5'-W C C A G T W-3'	PyPy- β -ImHp- γ -PyPy- β -ImIm
15	690 β) 5'-W C C A G A W-3'	PyPy- β -ImPy- γ -HpPy- β -ImIm
	691 β) 5'-W C C A G G W-3'	PyPy- β -ImIm- γ -PyPy- β -ImIm
	692 β) 5'-W C C A G C W-3'	PyPy- β -ImPy- γ -ImPy- β -ImIm
	693 β) 5'-W C C A C T W-3'	PyPyPyPyHp- γ -PyIm- β -ImIm
	693 β p) 5'-W C C A C T W-3'	PyPy- β -PyHp- γ -PyIm- β -ImIm
20	694 β) 5'-W C C A C A W-3'	PyPyPyPyPy- γ -HpIm- β -ImIm
	694 β p) 5'-W C C A C A W-3'	PyPy- β -PyPy- γ -HpIm- β -ImIm
	695 β) 5'-W C C A C G W-3'	PyPy- β -PyIm- γ -PyIm- β -ImIm
	696 β) 5'-W C C A C C W-3'	PyPyPyPyPy- γ -ImIm- β -ImIm
	696 β p) 5'-W C C A C C W-3'	PyPy- β -PyPy- γ -ImIm- β -ImIm

TABLE 67: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	697 β) 5'-W C C G T T W-3'	Py- β -ImHpHp- γ -PyPy- β -ImIm
	698 β) 5'-W C C G T A W-3'	Py- β -ImHpPy- γ -HpPy- β -ImIm
	699 β) 5'-W C C G T G W-3'	Py- β -ImHpIm- γ -PyPy- β -ImIm
	700 β) 5'-W C C G T C W-3'	Py- β -ImHpPy- γ -ImPy- β -ImIm
	701 β) 5'-W C C G A T W-3'	Py- β -ImPyHp- γ -PyHp- β -ImIm
	702 β) 5'-W C C G A A W-3'	Py- β -ImPyPy- γ -HpHp- β -ImIm
10	703 β) 5'-W C C G A G W-3'	Py- β -ImPyIm- γ -PyHp- β -ImIm
	704 β) 5'-W C C G A C W-3'	Py- β -ImPyPy- γ -ImHp- β -ImIm
	705 β) 5'-W C C G G T W-3'	Py- β -ImImHp- γ -PyPy- β -ImIm
	706 β) 5'-W C C G G A W-3'	Py- β -ImImPy- γ -HpPy- β -ImIm
	707 β) 5'-W C C G C T W-3'	Py- β -ImPyHp- γ -PyIm- β -ImIm
15	708 β) 5'-W C C G C A W-3'	Py- β -ImPyPy- γ -HpIm- β -ImIm
	709 β) 5'-W C C C T T W-3'	PyPyPyHpHp- γ -Py- β -ImImIm
	709 β p) 5'-W C C C T T W-3'	PyPyPy- β -Hp- γ -Py- β -ImImIm
	710 β) 5'-W C C C T A W-3'	PyPyPyHpPy- γ -Hp- β -ImImIm
	710 β p) 5'-W C C C T A W-3'	PyPyPy- β -Py- γ -Hp- β -ImImIm
20	711 β) 5'-W C C C T G W-3'	PyPy- β -HpIm- γ -Py- β -ImImIm
	712 β) 5'-W C C C T C W-3'	PyPyPyHpPy- γ -Im- β -ImImIm
	712 β p) 5'-W C C C T C W-3'	PyPyPy- β -Py- γ -Im- β -ImImIm
	713 β) 5'-W C C C A T W-3'	PyPyPyPyHp- γ -Py- β -ImImIm
	713 β p) 5'-W C C C A T W-3'	PyPyPy- β -Hp- γ -Py- β -ImImIm
25	714 β) 5'-W C C C A A W-3'	PyPyPyPyPy- γ -Hp- β -ImImIm
	714 β p) 5'-W C C C A A W-3'	PyPyPy- β -Py- γ -Hp- β -ImImIm
	715 β) 5'-W C C C A G W-3'	PyPy- β -PyIm- γ -Py- β -ImImIm
	716 β) 5'-W C C C A C W-3'	PyPyPyPyPy- γ -Im- β -ImImIm
	716 β p) 5'-W C C C A C W-3'	PyPyPy- β -Py- γ -Im- β -ImImIm
30	717 β) 5'-W C C C G T W-3'	PyPy- β -ImHp- γ -Py- β -ImImIm
	718 β) 5'-W C C C G A W-3'	PyPy- β -ImPy- γ -Hp- β -ImImIm

-105-

TABLE 67 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WCCSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
G41 β)	5'-W C C G G G W-3'	Py- β -ImImIm- γ -PyPy- β -ImIm
G42 β)	5'-W C C G G C W-3'	Py- β -ImImPy- γ -ImPy- β -ImIm
5	G43 β) 5'-W C C G C G W-3'	Py- β -ImPyIm- γ -PyIm- β -ImIm
G44 β)	5'-W C C G C C W-3'	Py- β -ImPyPy- γ -ImIm- β -ImIm
G45 β)	5'-W C C C G G W-3'	PyPy- β -ImIm- γ -Py- β -ImImIm
G46 β)	5'-W C C C G C W-3'	PyPy- β -ImPy- γ -Im- β -ImImIm
G47 β)	5'-W C C C C G W-3'	PyPy- β -PyIm- γ -PyImImIm

TABLE 68: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	723 β) 5'-W A G T T G W-3'	PyIm- β -HpIm- γ -PyPyPyPyHp
	723 β p) 5'-W A G T T G W-3'	PyIm- β -HpIm- γ -PyPy- β -PyHp
	727 β) 5'-W A G T A G W-3'	PyIm- β -PyIm- γ -PyHpPyPyHp
	727 β p) 5'-W A G T A G W-3'	PyIm- β -PyIm- γ -PyHp- β -PyHp
	729 β) 5'-W A G T G T W-3'	PyIm- β -ImHp- γ -PyPyPyPyHp
	729 β p) 5'-W A G T G T W-3'	PyIm- β -ImHp- γ -PyPy- β -PyHp
10	730 β) 5'-W A G T G A W-3'	PyIm- β -ImPy- γ -HpPyPyPyHp
	730 β p) 5'-W A G T G A W-3'	PyIm- β -ImPy- γ -HpPy- β -PyHp
	731 β) 5'-W A G T G G W-3'	PyIm- β -ImIm- γ -PyPyPyPyHp
	731 β p) 5'-W A G T G G W-3'	PyIm- β -ImIm- γ -PyPy- β -PyHp
	732 β) 5'-W A G T G C W-3'	PyIm- β -ImPy- γ -ImPyPyPyHp
	732 β p) 5'-W A G T G C W-3'	PyIm- β -ImPy- γ -ImPy- β -PyHp
15	735 β) 5'-W A G T C G W-3'	PyIm- β -PyIm- γ -PyImPyPyHp
	735 β p) 5'-W A G T C G W-3'	PyIm- β -PyIm- γ -PyIm- β -PyHp
	739 β) 5'-W A G A T G W-3'	PyIm- β -HpIm- γ -PyPyHpPyHp
	739 β p) 5'-W A G A T G W-3'	PyIm- β -HpIm- γ -PyPy- β -PyHp
20	743 β) 5'-W A G A A G W-3'	PyIm- β -PyIm- γ -PyHpHpPyHp
	743 β p) 5'-W A G A A G W-3'	PyIm- β -PyIm- γ -PyHp- β -PyHp
	745 β) 5'-W A G A G T W-3'	PyIm- β -ImHp- γ -PyPyHpPyHp
	745 β p) 5'-W A G A G T W-3'	PyIm- β -ImHp- γ -PyPy- β -PyHp
	746 β) 5'-W A G A G A W-3'	PyIm- β -ImPy- γ -HpPyHpPyHp
	746 β p) 5'-W A G A G A W-3'	PyIm- β -ImPy- γ -HpPy- β -PyHp
25	747 β) 5'-W A G A G G W-3'	PyIm- β -ImIm- γ -PyPyHpPyHp
	747 β p) 5'-W A G A G G W-3'	PyIm- β -ImIm- γ -PyPy- β -PyHp
	748 β) 5'-W A G A G C W-3'	PyIm- β -ImPy- γ -ImPyHpPyHp
	748 β p) 5'-W A G A G C W-3'	PyIm- β -ImPy- γ -ImPy- β -PyHp
30	751 β) 5'-W A G A C G W-3'	PyIm- β -PyIm- γ -PyImHpPyHp
	751 β p) 5'-W A G A C G W-3'	PyIm- β -PyIm- γ -PyIm- β -PyHp

TABLE 69: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	753 β) 5'-W A G G T T W-3'	PyImIm- β -Hp- γ -PyPyPyPyHp
	753 β p) 5'-W A G G T T W-3'	PyImIm- β -Hp- γ -Py- β -PyPyHp
	754 β) 5'-W A G G T A W-3'	PyImIm- β -Py- γ -HpPyPyPyHp
	754 β p) 5'-W A G G T A W-3'	PyImIm- β -Py- γ -Hp- β -PyPyHp
10	755 β) 5'-W A G G T G W-3'	PyImIm- β -Im- γ -PyPyPyPyHp
	755 β p) 5'-W A G G T G W-3'	PyImIm- β -Im- γ -Py- β -PyPyHp
	756 β) 5'-W A G G T C W-3'	PyImIm- β -Py- γ -ImPyPyPyHp
	756 β p) 5'-W A G G T C W-3'	PyImIm- β -Py- γ -Im- β -PyPyHp
	757 β) 5'-W A G G A T W-3'	PyImIm- β -Hp- γ -PyHpPyPyHp
	757 β p) 5'-W A G G A T W-3'	PyImIm- β -Hp- γ -Py- β -PyPyHp
	758 β) 5'-W A G G A A W-3'	PyImIm- β -Py- γ -HpHpPyPyHp
15	758 β p) 5'-W A G G A A W-3'	PyImIm- β -Py- γ -Hp- β -PyPyHp
	759 β) 5'-W A G G A G W-3'	PyImIm- β -Im- γ -PyHpPyPyHp
	759 β p) 5'-W A G G A G W-3'	PyImIm- β -Im- γ -Py- β -PyPyHp
	760 β) 5'-W A G G A C W-3'	PyImIm- β -Py- γ -ImHpPyPyHp
	760 β p) 5'-W A G G A C W-3'	PyImIm- β -Py- γ -Im- β -PyPyHp
20	763 β) 5'-W A G G C T W-3'	PyImIm- β -Hp- γ -PyImPyPyHp
	764 β) 5'-W A G G C A W-3'	PyImIm- β -Py- γ -HpImPyPyHp
	765 β) 5'-W A G C T T W-3'	PyImPyHpHp- γ -Py- β -ImPyHp
	765 β p) 5'-W A G C T T W-3'	PyImPy- β -Hp- γ -Py- β -ImPyHp
	766 β) 5'-W A G C T A W-3'	PyImPyHpPy- γ -Hp- β -ImPyHp
25	766 β p) 5'-W A G C T A W-3'	PyImPy- β -Py- γ -Hp- β -ImPyHp
	767 β) 5'-W A G C T G W-3'	PyIm- β -HpIm- γ -Py- β -ImPyHp
	768 β) 5'-W A G C T C W-3'	PyImPyHpPy- γ -Im- β -ImPyHp
	768 β p) 5'-W A G C T C W-3'	PyImPy- β -Py- γ -Im- β -ImPyHp
	769 β) 5'-W A G C A T W-3'	PyImPyPyHp- γ -Py- β -ImPyHp
30	769 β p) 5'-W A G C A T W-3'	PyImPy- β -Hp- γ -Py- β -ImPyHp
	770 β) 5'-W A G C A A W-3'	PyImPyPyPy- γ -Hp- β -ImPyHp

TABLE 69 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	770 β p) 5'-W A G C A A W-3'	PyImPy- β -Py- γ -Hp- β -ImPyHp
5	771 β) 5'-W A G C A G W-3'	PyIm- β -PyIm- γ -Py- β -ImPyHp
	772 β) 5'-W A G C A C W-3'	PyImPyPyPy- γ -Im- β -ImPyHp
	772 β p) 5'-W A G C A C W-3'	PyImPy- β -Py- γ -Im- β -ImPyHp
	773 β) 5'-W A G C G T W-3'	PyIm- β -ImHp- γ -Py- β -ImPyHp
	774 β) 5'-W A G C G A W-3'	PyIm- β -ImPy- γ -Hp- β -ImPyHp
10	775 β) 5'-W A G C C T W-3'	PyImPyPyHp- γ -PyImIm- β -Hp
	776 β) 5'-W A G C C A W-3'	PyImPyPyPy- γ -HpImIm- β -Hp
	779 β) 5'-W A G G C G W-3'	PyImIm- β -Im- γ -PyImPyPyHp
	780 β) 5'-W A G G C C W-3'	PyImIm- β -Py- γ -ImImPyPyHp
	781 β) 5'-W A G C G G W-3'	PyIm- β -ImIm- γ -Py- β -ImPyHp
15	782 β) 5'-W A G C G C W-3'	PyIm- β -ImPy- γ -Im- β -ImPyHp
	783 β) 5'-W A G C C G W-3'	PyIm- β -PyIm- γ -PyImIm- β -Hp
	784 β) 5'-W A G C C C W-3'	PyImPyPyPy- γ -ImImIm- β -Hp

TABLE 70: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	787 β) 5'-W A T T T G W-3'	PyHp- β -HpIm- γ -PyPyPyPyHp
	787 β p) 5'-W A T T T G W-3'	PyHp- β -HpIm- γ -PyPy- β -PyHp
	791 β) 5'-W A T T A G W-3'	PyHp- β -PyIm- γ -PyHpPyPyHp
	791 β p) 5'-W A T T A G W-3'	PyHp- β -PyIm- γ -PyHp- β -PyHp
	793 β) 5'-W A T T G T W-3'	PyHp- β -ImHp- γ -PyPyPyPyHp
	793 β p) 5'-W A T T G T W-3'	PyHp- β -ImHp- γ -PyPy- β -PyHp
10	794 β) 5'-W A T T G A W-3'	PyHp- β -ImPy- γ -HpPyPyPyHp
	794 β p) 5'-W A T T G A W-3'	PyHp- β -ImPy- γ -HpPy- β -PyHp
	795 β) 5'-W A T T G G W-3'	PyHp- β -ImIm- γ -PyPyPyPyHp
	795 β p) 5'-W A T T G G W-3'	PyHp- β -ImPy- γ -ImPyPyPyHp
	796 β p) 5'-W A T T G C W-3'	PyHp- β -ImPy- γ -ImPy- β -PyHp
15	799 β) 5'-W A T T C G W-3'	PyHp- β -PyIm- γ -PyImPyPyHp
	799 β p) 5'-W A T T C G W-3'	PyHp- β -PyIm- γ -PyIm- β -PyHp
	803 β) 5'-W A T A T G W-3'	PyHp- β -HpIm- γ -PyPyHpPyHp
	803 β p) 5'-W A T A T G W-3'	PyHp- β -HpIm- γ -PyPy- β -PyHp
	807 β) 5'-W A T A A G W-3'	PyHp- β -PyIm- γ -PyHpHpPyHp
20	807 β p) 5'-W A T A A G W-3'	PyHp- β -PyIm- γ -PyHp- β -PyHp
	809 β) 5'-W A T A G T W-3'	PyHp- β -ImHp- γ -PyPyHpPyHp
	809 β p) 5'-W A T A G T W-3'	PyHp- β -ImHp- γ -PyPy- β -PyHp
	810 β) 5'-W A T A G A W-3'	PyHp- β -ImPy- γ -HpPyHpPyHp
	810 β p) 5'-W A T A G A W-3'	PyHp- β -ImPy- γ -HpPy- β -PyHp
25	811 β) 5'-W A T A G G W-3'	PyHp- β -ImIm- γ -PyPyHpPyHp
	811 β p) 5'-W A T A G G W-3'	PyHp- β -ImIm- γ -PyPy- β -PyHp
	812 β) 5'-W A T A G C W-3'	PyHp- β -ImPy- γ -ImPyHpPyHp
	812 β p) 5'-W A T A G C W-3'	PyHp- β -ImPy- γ -ImPy- β -PyHp
	815 β) 5'-W A T A C G W-3'	PyHp- β -PyIm- γ -PyImHpPyHp
30	815 β p) 5'-W A T A C G W-3'	PyHp- β -PyIm- γ -PyIm- β -PyHp

TABLE 71: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	817 β) 5'-W A T G T T W-3'	Py- β -ImHpHp- γ -PyPyPyPyPyHp
5	817 β p) 5'-W A T G T T W-3'	Py- β -ImHpHp- γ -PyPyPyPy- β -Hp
	818 β) 5'-W A T G T A W-3'	Py- β -ImHpPy- γ -HpPyPyPyHp
	818 β p) 5'-W A T G T A W-3'	Py- β -ImHpPy- γ -HpPyPyPy- β -Hp
	819 β) 5'-W A T G T G W-3'	Py- β -ImHpIm- γ -PyPyPyPyPyHp
	819 β p) 5'-W A T G T G W-3'	Py- β -ImHpIm- γ -PyPyPyPy- β -Hp
10	820 β) 5'-W A T G T C W-3'	Py- β -ImHpPy- γ -ImPyPyPyPyHp
	820 β p) 5'-W A T G T C W-3'	Py- β -ImHpPy- γ -ImPyPy- β -Hp
	821 β) 5'-W A T G A T W-3'	Py- β -ImPyHp- γ -PyHpPyPyHp
	821 β p) 5'-W A T G A T W-3'	Py- β -ImPyHp- γ -PyHpPy- β -Hp
	822 β) 5'-W A T G A A W-3'	Py- β -ImPyPy- γ -HpHpPyPyHp
15	822 β p) 5'-W A T G A A W-3'	Py- β -ImPyPy- γ -HpHpPy- β -Hp
	823 β) 5'-W A T G A G W-3'	Py- β -ImPyIm- γ -PyHpPyPyHp
	823 β p) 5'-W A T G A G W-3'	Py- β -ImPyIm- γ -PyHpPy- β -Hp
	824 β) 5'-W A T G A C W-3'	Py- β -ImPyPy- γ -ImHpPyPyHp
	824 β p) 5'-W A T G A C W-3'	Py- β -ImPyPy- γ -ImHpPy- β -Hp
20	825 β) 5'-W A T G G T W-3'	Py- β -ImImHp- γ -PyPyPyPyPyHp
	825 β p) 5'-W A T G G T W-3'	Py- β -ImImHp- γ -PyPyPy- β -Hp
	826 β) 5'-W A T G G A W-3'	Py- β -ImImPy- γ -HpPyPyPyHp
	826 β p) 5'-W A T G G A W-3'	Py- β -ImImPy- γ -HpPyPy- β -Hp
	827 β) 5'-W A T G C T W-3'	Py- β -ImPyHp- γ -PyImPyPyHp
25	827 β p) 5'-W A T G C T W-3'	Py- β -ImPyHp- γ -PyImPy- β -Hp
	828 β) 5'-W A T G C A W-3'	Py- β -ImPyPy- γ -HpImPyPyHp
	828 β p) 5'-W A T G C A W-3'	Py- β -ImPyPy- γ -HpImPy- β -Hp
	829 β) 5'-W A T G G G W-3'	Py- β -ImImIm- γ -PyPyPyPyPyHp
	829 β p) 5'-W A T G G G W-3'	Py- β -ImImIm- γ -PyPyPy- β -Hp
30	830 β) 5'-W A T G G C W-3'	Py- β -ImImPy- γ -ImPyPyPyHp
	830 β p) 5'-W A T G G C W-3'	Py- β -ImImPy- γ -ImPyPy- β -Hp
	831 β) 5'-W A T G C G W-3'	Py- β -ImPyIm- γ -PyImPyPyHp
	831 β p) 5'-W A T G C G W-3'	Py- β -ImPyIm- γ -PyImPy- β -Hp

TABLE 71: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WATSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	832 β) 5'-W A T G C C W-3'	Py- β -ImPyPy- γ -ImImPyPyHp
5	832 β p) 5'-W A T G C C W-3'	Py- β -ImPyPy- γ -ImImPy- β -Hp
	833 β) 5'-W A T C T T W-3'	PyHpPyHpHp- γ -Py- β -ImPyHp
	833 β p) 5'-W A T C T T W-3'	PyHpPy- β -Hp- γ -Py- β -ImPyHp
	834 β) 5'-W A T C T A W-3'	PyHpPyHpPy- γ -Hp- β -ImPyHp
	834 β p) 5'-W A T C T A W-3'	PyHpPy- β -Py- γ -Hp- β -ImPyHp
10	835 β) 5'-W A T C T G W-3'	PyHp- β -HpIm- γ -Py- β -ImPyHp
	836 β) 5'-W A T C T C W-3'	PyHpPyHpPy- γ -Im- β -ImPyHp
	836 β p) 5'-W A T C T C W-3'	PyHpPy- β -Py- γ -Im- β -ImPyHp
	837 β) 5'-W A T C A T W-3'	PyHpPyHp- γ -Py- β -ImPyHp
	837 β p) 5'-W A T C A T W-3'	PyHpPy- β -Hp- γ -Py- β -ImPyHp
15	838 β) 5'-W A T C A A W-3'	PyHpPyPyPy- γ -Hp- β -ImPyHp
	838 β p) 5'-W A T C A A W-3'	PyHpPy- β -Py- γ -Hp- β -ImPyHp
	839 β) 5'-W A T C A G W-3'	PyHp- β -PyIm- γ -Py- β -ImPyHp
	840 β) 5'-W A T C A C W-3'	PyHpPyPyPy- γ -Im- β -ImPyHp
	840 β p) 5'-W A T C A C W-3'	PyHpPy- β -Py- γ -Im- β -ImPyHp
20	841 β) 5'-W A T C G T W-3'	PyHp- β -ImHp- γ -Py- β -ImPyHp
	842 β) 5'-W A T C G A W-3'	PyHp- β -ImPy- γ -Hp- β -ImPyHp
	843 β) 5'-W A T C C T W-3'	PyHpPyPyHp- γ -PyImIm- β -Hp
	843 β p) 5'-W A T C C T W-3'	Py- β -PyPyHp- γ -PyImIm- β -Hp
	844 β) 5'-W A T C C A W-3'	PyHpPyPyPy- γ -HpImIm- β -Hp
25	844 β p) 5'-W A T C C A W-3'	Py- β -PyPyPy- γ -HpImIm- β -Hp
	845 β) 5'-W A T C G G W-3'	PyHp- β -ImIm- γ -Py- β -ImPyHp
	846 β) 5'-W A T C G C W-3'	PyHp- β -ImPy- γ -Im- β -ImPyHp
	847 β) 5'-W A T C C G W-3'	PyHp- β -PyIm- γ -PyImIm- β -Hp
	848 β) 5'-W A T C C C W-3'	PyHpPyPyPy- γ -ImImIm- β -Hp
30	848 β p) 5'-W A T C C C W-3'	Py- β -PyPyPy- γ -ImImIm- β -Hp

TABLE 72: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAAWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	851 β) 5'-W A A T T G W-3'	PyPy- β -HpIm- γ -PyPyPyHpHp
	851 β p) 5'-W A A T T G W-3'	PyPy- β -HpIm- γ -PyPy- β -HpHp
	855 β) 5'-W A A T A G W-3'	PyPy- β -PyIm- γ -PyHpPyHpHp
	855 β p) 5'-W A A T A G W-3'	PyPy- β -PyIm- γ -PyHp- β -HpHp
	857 β) 5'-W A A T G T W-3'	PyPy- β -ImHp- γ -PyPyPyHpHp
	857 β p) 5'-W A A T G T W-3'	PyPy- β -ImHp- γ -PyPy- β -HpHp
10	858 β) 5'-W A A T G A W-3'	PyPy- β -ImPy- γ -HpPyPyHpHp
	858 β p) 5'-W A A T G A W-3'	PyPy- β -ImPy- γ -HpPy- β -HpHp
	859 β) 5'-W A A T G G W-3'	PyPy- β -ImIm- γ -PyPyPyHpHp
	859 β p) 5'-W A A T G G W-3'	PyPy- β -ImIm- γ -PyPy- β -HpHp
	860 β) 5'-W A A T G C W-3'	PyPy- β -ImPy- γ -ImPyPyHpHp
15	860 β p) 5'-W A A T G C W-3'	PyPy- β -ImPy- γ -ImPy- β -HpHp
	863 β) 5'-W A A T C G W-3'	PyPy- β -PyIm- γ -PyImPyHpHp
	863 β p) 5'-W A A T C G W-3'	PyPy- β -PyIm- γ -PyIm- β -HpHp
	867 β) 5'-W A A A T G W-3'	PyPy- β -HpIm- γ -PyPyHpHpHp
	867 β p) 5'-W A A A T G W-3'	PyPy- β -HpIm- γ -PyPy- β -HpHp
20	871 β) 5'-W A A A A G W-3'	PyPy- β -PyIm- γ -PyHpHpHpHp
	871 β p) 5'-W A A A A G W-3'	PyPy- β -PyIm- γ -PyHp- β -HpHp
	873 β) 5'-W A A A G T W-3'	PyPy- β -ImHp- γ -PyPyHpHpHp
	873 β p) 5'-W A A A G T W-3'	PyPy- β -ImHp- γ -PyPy- β -HpHp
	874 β) 5'-W A A A G A W-3'	PyPy- β -ImPy- γ -HpPyHpHpHp
25	874 β p) 5'-W A A A G A W-3'	PyPy- β -ImPy- γ -HpPy- β -HpHp
	875 β) 5'-W A A A G G W-3'	PyPy- β -ImIm- γ -PyPyHpHpHp
	875 β p) 5'-W A A A G G W-3'	PyPy- β -ImIm- γ -PyPy- β -HpHp
	876 β) 5'-W A A A G C W-3'	PyPy- β -ImPy- γ -ImPyHpHpHp
	876 β p) 5'-W A A A G C W-3'	PyPy- β -ImPy- γ -ImPy- β -HpHp
30	879 β) 5'-W A A A C G W-3'	PyPy- β -PyIm- γ -PyImHpHpHp
	879 β p) 5'-W A A A C G W-3'	PyPy- β -PyIm- γ -PyIm- β -HpHp

TABLE 73: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	881 β) 5'-W A A G T T W-3'	Py- β -ImHpHp- γ -PyPyPyHpHp
	881 β p) 5'-W A A G T T W-3'	Py- β -ImHpHp- γ -PyPyPy- β -Hp
	882 β) 5'-W A A G T A W-3'	Py- β -ImHpPy- γ -HpPyPyHpHp
	882 β p) 5'-W A A G T A W-3'	Py- β -ImHpPy- γ -HpPyPy- β -Hp
10	883 β) 5'-W A A G T G W-3'	Py- β -ImHpIm- γ -PyPyPyHpHp
	883 β p) 5'-W A A G T G W-3'	Py- β -ImHpIm- γ -PyPyPy- β -Hp
	884 β) 5'-W A A G T C W-3'	Py- β -ImHpPy- γ -ImPyPyHpHp
	884 β p) 5'-W A A G T C W-3'	Py- β -ImHpPy- γ -ImPyPy- β -Hp
	885 β) 5'-W A A G A T W-3'	Py- β -ImPyHp- γ -PyHpPyHpHp
	885 β p) 5'-W A A G A T W-3'	Py- β -ImPyHp- γ -PyHpPy- β -Hp
	886 β) 5'-W A A G A A W-3'	Py- β -ImPyPy- γ -HpHpPyHpHp
15	886 β p) 5'-W A A G A A W-3'	Py- β -ImPyPy- γ -HpHpPy- β -Hp
	887 β) 5'-W A A G A G W-3'	Py- β -ImPyIm- γ -PyHpPyHpHp
	887 β p) 5'-W A A G A G W-3'	Py- β -ImPyIm- γ -PyHpPy- β -Hp
	888 β) 5'-W A A G A C W-3'	Py- β -ImPyPy- γ -ImHpPyHpHp
	888 β p) 5'-W A A G A C W-3'	Py- β -ImPyPy- γ -ImHpPy- β -Hp
20	889 β) 5'-W A A G G T W-3'	Py- β -ImImHp- γ -PyPyPyHpHp
	889 β p) 5'-W A A G G T W-3'	Py- β -ImImHp- γ -PyPyPy- β -Hp
	890 β) 5'-W A A G G A W-3'	Py- β -ImImPy- γ -HpPyPyHpHp
	890 β p) 5'-W A A G G A W-3'	Py- β -ImImPy- γ -HpPyPy- β -Hp
	891 β) 5'-W A A G C T W-3'	Py- β -ImPyHp- γ -PyImPyHpHp
25	891 β p) 5'-W A A G C T W-3'	Py- β -ImPyHp- γ -PyImPy- β -Hp
	892 β) 5'-W A A G C A W-3'	Py- β -ImPyPy- γ -HpImPyHpHp
	892 β p) 5'-W A A G C A W-3'	Py- β -ImPyPy- γ -HpImPy- β -Hp
	893 β) 5'-W A A G G G W-3'	Py- β -ImImIm- γ -PyPyPyHpHp
	893 β p) 5'-W A A G G G W-3'	Py- β -ImImIm- γ -PyPyPy- β -Hp
30	894 β) 5'-W A A G G C W-3'	Py- β -ImImPy- γ -ImPyPyHpHp
	894 β p) 5'-W A A G G C W-3'	Py- β -ImImPy- γ -ImPyPy- β -Hp
	895 β) 5'-W A A G C G W-3'	Py- β -ImPyIm- γ -PyImPyHpHp
	895 β p) 5'-W A A G C G W-3'	Py- β -ImPyIm- γ -PyImPy- β -Hp

TABLE 73 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WAASNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	896 β) 5'-W A A G C C W-3'	Py- β -ImPyPy- γ -ImImPyHpHp
	896 β p) 5'-W A A G C C W-3'	Py- β -ImPyPy- γ -ImImPy- β -Hp
5	897 β) 5'-W A A C T T W-3'	PyPyPyHpHp- γ -Py- β -ImHpHp
	897 β p) 5'-W A A C T T W-3'	PyPyPy- β -Hp- γ -Py- β -ImHpHp
	898 β) 5'-W A A C T A W-3'	PyPyPyHpPy- γ -Hp- β -ImHpHp
	898 β p) 5'-W A A C T A W-3'	PyPyPy- β -Py- γ -Hp- β -ImHpHp
10	899 β) 5'-W A A C T G W-3'	PyPy- β -HpIm- γ -Py- β -ImHpHp
	900 β) 5'-W A A C T C W-3'	PyPyPyHpPy- γ -Im- β -ImHpHp
	900 β p) 5'-W A A C T C W-3'	PyPyPy- β -Py- γ -Im- β -ImHpHp
	901 β) 5'-W A A C A T W-3'	PyPyPyPyHp- γ -Py- β -ImHpHp
	901 β p) 5'-W A A C A T W-3'	PyPyPy- β -Hp- γ -Py- β -ImHpHp
	902 β) 5'-W A A C A A W-3'	PyPyPyPyPy- γ -Hp- β -ImHpHp
15	902 β p) 5'-W A A C A A W-3'	PyPyPy- β -Py- γ -Hp- β -ImHpHp
	903 β) 5'-W A A C A G W-3'	PyPy- β -PyIm- γ -Py- β -ImHpHp
	904 β) 5'-W A A C A C W-3'	PyPyPyPyPy- γ -Im- β -ImHpHp
	904 β p) 5'-W A A C A C W-3'	PyPyPy- β -Py- γ -Im- β -ImHpHp
	905 β) 5'-W A A C G T W-3'	PyPy- β -ImHp- γ -Py- β -ImHpHp
20	906 β) 5'-W A A C G A W-3'	PyPy- β -ImPy- γ -Hp- β -ImHpHp
	907 β) 5'-W A A C C T W-3'	PyPyPyPyHp- γ -PyImIm- β -Hp
	907 β p) 5'-W A A C C T W-3'	Py- β -PyPyHp- γ -PyImIm- β -Hp
	908 β) 5'-W A A C C A W-3'	PyPyPyPyPy- γ -HpImIm- β -Hp
	908 β p) 5'-W A A C C A W-3'	Py- β -PyPyPy- γ -HpImIm- β -Hp
25	909 β) 5'-W A A C G G W-3'	PyPy- β -ImIm- γ -Py- β -ImHpHp
	910 β) 5'-W A A C G C W-3'	PyPy- β -ImPy- γ -Im- β -ImHpHp
	911 β) 5'-W A A C C G W-3'	PyPy- β -PyIm- γ -PyImIm- β -Hp
	912 β) 5'-W A A C C C W-3'	PyPyPyPyPy- γ -ImImIm- β -Hp
	912 β p) 5'-W A A C C C W-3'	Py- β -PyPyPy- γ -ImImIm- β -Hp

TABLE 74: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	913 β) 5'-W A C T T T W-3'	PyPyH _p H _p H _p - γ -PyPy- β -ImH _p
	913 β p) 5'-W A C T T T W-3'	PyPy- β -H _p H _p - γ -PyPy- β -ImH _p
	914 β) 5'-W A C T T A W-3'	PyPyH _p H _p Py- γ -H _p Py- β -ImH _p
	914 β p) 5'-W A C T T A W-3'	PyPy- β -H _p Py- γ -H _p Py- β -ImH _p
	915 β) 5'-W A C T T G W-3'	PyPy- β -H _p Im- γ -PyPy- β -ImH _p
10	916 β) 5'-W A C T T C W-3'	PyPyH _p H _p Py- γ -ImPy- β -ImH _p
	916 β p) 5'-W A C T T C W-3'	PyPy- β -H _p Py- γ -ImPy- β -ImH _p
	917 β) 5'-W A C T A T W-3'	PyPyH _p PyH _p - γ -PyH _p - β -ImH _p
	917 β p) 5'-W A C T A T W-3'	PyPyH _p PyH _p - γ -PyH _p - β -ImH _p
	918 β) 5'-W A C T A A W-3'	PyPyH _p PyPy- γ -H _p H _p - β -ImH _p
	918 β p) 5'-W A C T A A W-3'	PyPy- β -PyPy- γ -H _p H _p - β -ImH _p
15	919 β) 5'-W A C T A G W-3'	PyPy- β -PyIm- γ -PyH _p - β -ImH _p
	920 β) 5'-W A C T A C W-3'	PyPyH _p PyPy- γ -ImH _p - β -ImH _p
	920 β p) 5'-W A C T A C W-3'	PyPy- β -PyPy- γ -ImH _p - β -ImH _p
	921 β) 5'-W A C T G T W-3'	PyPy- β -ImH _p - γ -PyPy- β -ImH _p
	922 β) 5'-W A C T G A W-3'	PyPy- β -ImPy- γ -H _p Py- β -ImH _p
20	923 β) 5'-W A C T G G W-3'	PyPy- β -ImIm- γ -PyPy- β -ImH _p
	924 β) 5'-W A C T G C W-3'	PyPy- β -ImPy- γ -ImPy- β -ImH _p
	925 β) 5'-W A C T C T W-3'	PyPyH _p PyH _p - γ -PyIm- β -ImH _p
	925 β p) 5'-W A C T C T W-3'	PyPy- β -PyH _p - γ -PyIm- β -ImH _p
	926 β) 5'-W A C T C A W-3'	PyPyH _p PyPy- γ -H _p Im- β -ImH _p
25	926 β p) 5'-W A C T C A W-3'	PyPy- β -PyPy- γ -H _p Im- β -ImH _p
	927 β) 5'-W A C T C G W-3'	PyPy- β -PyIm- γ -PyIm- β -ImH _p
	928 β) 5'-W A C T C C W-3'	PyPyH _p PyPy- γ -ImIm- β -ImH _p
	928 β p) 5'-W A C T C C W-3'	PyPy- β -PyPy- γ -ImIm- β -ImH _p
	929 β) 5'-W A C A T T W-3'	PyPyPyH _p H _p - γ -PyPy- β -ImH _p
30	929 β p) 5'-W A C A T T W-3'	PyPy- β -H _p H _p - γ -PyPy- β -ImH _p
	930 β) 5'-W A C A T A W-3'	PyPyPyH _p Py- γ -H _p Py- β -ImH _p
	930 β p) 5'-W A C A T A W-3'	PyPy- β -H _p Py- γ -H _p Py- β -ImH _p
	931 β) 5'-W A C A T G W-3'	PyPy- β -H _p Im- γ -PyPy- β -ImH _p

TABLE 74 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	932 β) 5'-W A C A T C W-3'	PyPyPyH _p Py- γ -ImPy- β -ImH _p
	932 β p) 5'-W A C A T C W-3'	PyPy- β -H _p Py- γ -ImPy- β -ImH _p
	933 β) 5'-W A C A A T W-3'	PyPyPyH _p Py- γ -PyH _p - β -ImH _p
	933 β p) 5'-W A C A A T W-3'	PyPy- β -PyH _p - γ -PyH _p - β -ImH _p
10	934 β) 5'-W A C A A A W-3'	PyPyPyPyH _p - γ -H _p H _p - β -ImH _p
	934 β p) 5'-W A C A A A W-3'	PyPy- β -PyPy- γ -H _p H _p - β -ImH _p
	935 β) 5'-W A C A A G W-3'	PyPy- β -PyIm- γ -PyH _p - β -ImH _p
	936 β) 5'-W A C A A C W-3'	PyPyPyPyH _p - γ -ImH _p - β -ImH _p
	936 β p) 5'-W A C A A C W-3'	PyPy- β -PyPy- γ -ImH _p - β -ImH _p
	937 β) 5'-W A C A G T W-3'	PyPy- β -ImH _p - γ -PyPy- β -ImH _p
	938 β) 5'-W A C A G A W-3'	PyPy- β -ImPy- γ -H _p Py- β -ImH _p
15	939 β) 5'-W A C A G G W-3'	PyPy- β -ImIm- γ -PyPy- β -ImH _p
	940 β) 5'-W A C A G C W-3'	PyPy- β -ImPy- γ -ImPy- β -ImH _p
	941 β) 5'-W A C A C T W-3'	PyPyPyH _p Py- γ -PyIm- β -ImH _p
	941 β p) 5'-W A C A C T W-3'	PyPy- β -PyH _p - γ -PyIm- β -ImH _p
	942 β) 5'-W A C A C A W-3'	PyPyPyPyH _p - γ -H _p Im- β -ImH _p
20	942 β p) 5'-W A C A C A W-3'	PyPy- β -PyPy- γ -H _p Im- β -ImH _p
	943 β) 5'-W A C A C G W-3'	PyPy- β -PyIm- γ -PyIm- β -ImH _p
	944 β) 5'-W A C A C C W-3'	PyPyPyPyH _p - γ -ImIm- β -ImH _p
	944 β p) 5'-W A C A C C W-3'	PyPy- β -PyPy- γ -ImIm- β -ImH _p

TABLE 75: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	945 β) 5'-W A C G T T W-3'	Py- β -ImHpHp- γ -PyPy- β -ImHp
5	946 β) 5'-W A C G T A W-3'	Py- β -ImHpPy- γ -HpPy- β -ImHp
	947 β) 5'-W A C G T G W-3'	Py- β -ImHpIm- γ -PyPy- β -ImHp
	948 β) 5'-W A C G T C W-3'	Py- β -ImHpPy- γ -ImPy- β -ImHp
	949 β) 5'-W A C G A T W-3'	Py- β -ImPyHp- γ -PyHp- β -ImHp
	950 β) 5'-W A C G A A W-3'	Py- β -ImPyPy- γ -HpHp- β -ImHp
10	951 β) 5'-W A C G A G W-3'	Py- β -ImPyIm- γ -PyHp- β -ImHp
	952 β) 5'-W A C G A C W-3'	Py- β -ImPyPy- γ -ImHp- β -ImHp
	953 β) 5'-W A C G G T W-3'	Py- β -ImImHp- γ -PyPy- β -ImHp
	954 β) 5'-W A C G G A W-3'	Py- β -ImImPy- γ -HpPy- β -ImHp
	955 β) 5'-W A C G C T W-3'	Py- β -ImPyHp- γ -PyIm- β -ImHp
15	956 β) 5'-W A C G C A W-3'	Py- β -ImPyPy- γ -HpIm- β -ImHp
	957 β) 5'-W A C C T T W-3'	PyPyPyHpHp- γ -Py- β -ImImHp
	957 β p) 5'-W A C C T T W-3'	PyPyPy- β -Hp- γ -Py- β -ImImHp
	958 β) 5'-W A C C T A W-3'	PyPyPyHpPy- γ -Hp- β -ImImHp
	958 β p) 5'-W A C C T A W-3'	PyPyPy- β -Py- γ -Hp- β -ImImHp
20	959 β) 5'-W A C C T G W-3'	PyPy- β -HpIm- γ -Py- β -ImImHp
	960 β) 5'-W A C C T C W-3'	PyPyPyHpPy- γ -Im- β -ImImHp
	960 β p) 5'-W A C C T C W-3'	PyPyPy- β -Py- γ -Im- β -ImImHp
	961 β) 5'-W A C C A T W-3'	PyPyPyPyHp- γ -Py- β -ImImHp
	961 β p) 5'-W A C C A T W-3'	PyPyPy- β -Hp- γ -Py- β -ImImHp
25	962 β) 5'-W A C C A A W-3'	PyPyPyPyPy- γ -Hp- β -ImImHp
	962 β p) 5'-W A C C A A W-3'	PyPyPy- β -Py- γ -Hp- β -ImImHp
	963 β) 5'-W A C C A G W-3'	PyPy- β -PyIm- γ -Py- β -ImImHp
	964 β) 5'-W A C C A C W-3'	PyPyPyPyPy- γ -Im- β -ImImHp
	964 β p) 5'-W A C C A C W-3'	PyPyPy- β -Py- γ -Im- β -ImImHp
30	965 β) 5'-W A C C G T W-3'	PyPy- β -ImHp- γ -Py- β -ImImHp
	966 β) 5'-W A C C G A W-3'	PyPy- β -ImPy- γ -Hp- β -ImImHp
	969 β) 5'-W A C G G G W-3'	Py- β -ImImIm- γ -PyPy- β -ImHp
	970 β) 5'-W A C G G C W-3'	Py- β -ImImPy- γ -ImPy- β -ImHp

-118-

TABLE 75 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WACSNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	971 β) 5'-W A C G C G W-3'	Py- β -ImPyIm- γ -PyIm- β -ImHp
	972 β) 5'-W A C G C C W-3'	Py- β -ImPyPy- γ -ImIm- β -ImHp
5	973 β) 5'-W A C C G G W-3'	PyPy- β -ImIm- γ -Py- β -ImImHp
	974 β) 5'-W A C C G C W-3'	PyPy- β -ImPy- γ -Im- β -ImImHp
	975 β) 5'-W A C C C G W-3'	PyPy- β -PyIm- γ -PyImImImHp

TABLE 76: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGWNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	979 β) 5'-W T G T T G W-3'	HpIm- β -HpIm- γ -PyPyPyPyPy
5	979 β p) 5'-W T G T T G W-3'	HpIm- β -HpIm- γ -PyPy- β -PyPy
	983 β) 5'-W T G T A G W-3'	HpIm- β -PyIm- γ -PyHpPyPyPy
	983 β p) 5'-W T G T A G W-3'	HpIm- β -PyIm- γ -PyHp- β -PyPy
	985 β) 5'-W T G T G T W-3'	HpIm- β -ImHp- γ -PyPyPyPyPy
	985 β p) 5'-W T G T G T W-3'	HpIm- β -ImHp- γ -PyPy- β -PyPy
10	986 β) 5'-W T G T G A W-3'	HpIm- β -ImPy- γ -HpPyPyPyPy
	986 β p) 5'-W T G T G A W-3'	HpIm- β -ImPy- γ -HpPy- β -PyPy
	987 β) 5'-W T G T G G W-3'	HpIm- β -ImIm- γ -PyPyPyPyPy
	987 β p) 5'-W T G T G G W-3'	HpIm- β -ImIm- γ -PyPy- β -PyPy
	988 β) 5'-W T G T G C W-3'	HpIm- β -ImPy- γ -ImPyPyPyPy
15	988 β p) 5'-W T G T G C W-3'	HpIm- β -ImPy- γ -ImPy- β -PyPy
	991 β) 5'-W T G T C G W-3'	HpIm- β -PyIm- γ -PyImPyPyPy
	991 β p) 5'-W T G T C G W-3'	HpIm- β -PyIm- γ -PyIm- β -PyPy
	995 β) 5'-W T G A T G W-3'	HpIm- β -HpIm- γ -PyPyHpPyPy
	995 β p) 5'-W T G A T G W-3'	HpIm- β -HpIm- γ -PyPy- β -PyPy
20	999 β) 5'-W T G A A G W-3'	HpIm- β -PyIm- γ -PyHpHpPyPy
	999 β p) 5'-W T G A A G W-3'	HpIm- β -PyIm- γ -PyHp- β -PyPy
	1001 β) 5'-W T G A G T W-3'	HpIm- β -ImHp- γ -PyPyHpPyPy
	1001 β p) 5'-W T G A G T W-3'	HpIm- β -ImHp- γ -PyPy- β -PyPy
	1002 β) 5'-W T G A G A W-3'	HpIm- β -ImPy- γ -HpPyHpPyPy
25	1002 β p) 5'-W T G A G A W-3'	HpIm- β -ImPy- γ -HpPy- β -PyPy
	1003 β) 5'-W T G A G G W-3'	HpIm- β -ImIm- γ -PyPyHpPyPy
	1003 β p) 5'-W T G A G G W-3'	HpIm- β -ImIm- γ -PyPy- β -PyPy
	1004 β) 5'-W T G A G C W-3'	HpIm- β -ImPy- γ -ImPyHpPyPy
	1004 β p) 5'-W T G A G C W-3'	HpIm- β -ImPy- γ -ImPy- β -PyPy
30	1007 β) 5'-W T G A C G W-3'	HpIm- β -PyIm- γ -PyImHpPyPy
	1007 β p) 5'-W T G A C G W-3'	HpIm- β -PyIm- γ -PyIm- β -PyPy

TABLE 77: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	1009 β) 5'-W T G G T T W-3'	HpImIm- β -Hp- γ -PyPyPyPyPy
	1009 β p) 5'-W T G G T T W-3'	HpImIm- β -Hp- γ -Py- β -PyPyPy
	1010 β) 5'-W T G G T A W-3'	HpImIm- β -Py- γ -HpPyPyPyPy
	1010 β p) 5'-W T G G T A W-3'	HpImIm- β -Py- γ -Hp- β -PyPyPy
10	1011 β) 5'-W T G G T G W-3'	HpImIm- β -Im- γ -PyPyPyPyPy
	1011 β p) 5'-W T G G T G W-3'	HpImIm- β -Im- γ -Py- β -PyPyPy
	1012 β) 5'-W T G G T C W-3'	HpImIm- β -Py- γ -ImPyPyPyPy
	1012 β p) 5'-W T G G T C W-3'	HpImIm- β -Py- γ -Im- β -PyPyPy
15	1013 β) 5'-W T G G A T W-3'	HpImIm- β -Hp- γ -PyHpPyPyPy
	1013 β p) 5'-W T G G A T W-3'	HpImIm- β -Hp- γ -Py- β -PyPyPy
	1014 β) 5'-W T G G A A W-3'	HpImIm- β -Py- γ -HpHpPyPyPy
	1014 β p) 5'-W T G G A A W-3'	HpImIm- β -Py- γ -Hp- β -PyPyPy
20	1015 β) 5'-W T G G A G W-3'	HpImIm- β -Im- γ -PyHpPyPyPy
	1015 β p) 5'-W T G G A G W-3'	HpImIm- β -Im- γ -Py- β -PyPyPy
	1016 β) 5'-W T G G A C W-3'	HpImIm- β -Py- γ -ImHpPyPyPy
	1016 β p) 5'-W T G G A C W-3'	HpImIm- β -Py- γ -Im- β -PyPyPy
25	1019 β) 5'-W T G G C T W-3'	HpImIm- β -Hp- γ -PyImPyPyPy
	1020 β) 5'-W T G G C A W-3'	HpImIm- β -Py- γ -HpImPyPyPy
	1021 β) 5'-W T G C T T W-3'	HpImPyHpHp- γ -Py- β -ImPyPy
	1021 β p) 5'-W T G C T T W-3'	HpImPy- β -Hp- γ -Py- β -ImPyPy
	1022 β) 5'-W T G C T A W-3'	HpImPyHpPy- γ -Hp- β -ImPyPy
30	1022 β p) 5'-W T G C T A W-3'	HpImPy- β -Py- γ -Hp- β -ImPyPy
	1023 β) 5'-W T G C T G W-3'	HpIm- β -HpIm- γ -Py- β -ImPyPy
	1024 β) 5'-W T G C T C W-3'	HpImPyHpPy- γ -Im- β -ImPyPy
	1024 β p) 5'-W T G C T C W-3'	HpImPy- β -Py- γ -Im- β -ImPyPy
	1025 β) 5'-W T G C A T W-3'	HpImPyPyHp- γ -Py- β -ImPyPy
	1025 β p) 5'-W T G C A T W-3'	HpImPy- β -Hp- γ -Py- β -ImPyPy
	1026 β) 5'-W T G C A A W-3'	HpImPyPyPy- γ -Hp- β -ImPyPy
	1026 β p) 5'-W T G C A A W-3'	HpImPy- β -Py- γ -Hp- β -ImPyPy
	1027 β) 5'-W T G C A G W-3'	HpIm- β -PyIm- γ -Py- β -ImPyPy

TABLE 77 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTGSNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
	1028β) 5'-W T G C A C W-3'	HpImPyPyPy- γ -Im- β -ImPyP
5	1028βp) 5'-W T G C A C W-3'	HpImPy- β -Py- γ -Im- β -ImPyPy
	1029β) 5'-W T G C G T W-3'	HpIm- β -ImHp- γ -Py- β -ImPyPy
	1030β) 5'-W T G C G A W-3'	HpIm- β -ImPy- γ -Hp- β -ImPyPy
	1031β) 5'-W T G C C T W-3'	HpImPyPyH β - γ -PyImIm- β -Py
	1031βp) 5'-W T G C C T W-3'	HpImPy- β -Hp- γ -PyImIm- β -Py
10	1032β) 5'-W T G C C A W-3'	HpImPyPyPy- γ -H β ImIm- β -Py
	1032βp) 5'-W T G C C A W-3'	HpImPy- β -Py- γ -H β ImIm- β -Py
	1035β) 5'-W T G G C G W-3'	HpImIm- β -Im- γ -PyImPyPyPy
	1036β) 5'-W T G G C C W-3'	HpImIm- β -Py- γ -ImImPyPyPy
	1037β) 5'-W T G C G G W-3'	HpIm- β -ImIm- γ -Py- β -ImPyPy
15	1038β) 5'-W T G C G C W-3'	HpIm- β -ImPy- γ -Im- β -ImPyPy
	1039β) 5'-W T G C C G W-3'	HpIm- β -PyIm- γ -PyImIm- β -Py
	1040β) 5'-W T G C C C W-3'	HpImPyPyPy- γ -ImImIm- β -Py

TABLE 78: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTWNNW-3' with β substitutions.

	DNA sequence	aromatic amino acid sequence
5	1043 β) 5'-W T T T T G W-3'	HpHp- β -HpIm- γ -PyPyPyPyPy
	1043 β p) 5'-W T T T T G W-3'	HpHp- β -HpIm- γ -PyPy- β -PyPy
	1047 β) 5'-W T T T A G W-3'	HpHp- β -PyIm- γ -PyHpPyPyPy
	1047 β p) 5'-W T T T A G W-3'	HpHp- β -PyIm- γ -PyHp- β -PyPy
10	1049 β) 5'-W T T T G T W-3'	HpHp- β -ImHp- γ -PyPyPyPyPy
	1049 β p) 5'-W T T T G T W-3'	HpHp- β -ImHp- γ -PyPy- β -PyPy
	1050 β) 5'-W T T T G A W-3'	HpHp- β -ImPy- γ -HpPyPyPyPy
	1050 β p) 5'-W T T T G A W-3'	HpHp- β -ImPy- γ -HpPy- β -PyPy
15	1051 β) 5'-W T T T G G W-3'	HpHp- β -ImIm- γ -PyPyPyPyPy
	1051 β p) 5'-W T T T G G W-3'	HpHp- β -ImIm- γ -PyPy- β -PyPy
	1052 β) 5'-W T T T G C W-3'	HpHp- β -ImPy- γ -ImPyPyPyPy
	1052 β p) 5'-W T T T G C W-3'	HpHp- β -ImPy- γ -ImPy- β -PyPy
	1055 β) 5'-W T T T C G W-3'	HpHp- β -PyIm- γ -PyImPyPyPy
	1055 β p) 5'-W T T T C G W-3'	HpHp- β -PyIm- γ -PyIm- β -PyPy
	1059 β) 5'-W T T A T G W-3'	HpHp- β -HpIm- γ -PyPyHpPyPy
	1059 β p) 5'-W T T A T G W-3'	HpHp- β -HpIm- γ -PyPy- β -PyPy
20	1063 β) 5'-W T T A A G W-3'	HpHp- β -PyIm- γ -PyHpPyPy
	1063 β p) 5'-W T T A A G W-3'	HpHp- β -PyIm- γ -PyHp- β -PyPy
	1065 β) 5'-W T T A G T W-3'	HpHp- β -ImHp- γ -PyPyHpPyPy
	1065 β p) 5'-W T T A G T W-3'	HpHp- β -ImHp- γ -PyPy- β -PyPy
	1066 β) 5'-W T T A G A W-3'	HpHp- β -ImPy- γ -HpPyHpPyPy
25	1066 β p) 5'-W T T A G A W-3'	HpHp- β -ImPy- γ -HpPy- β -PyPy
	1067 β) 5'-W T T A G G W-3'	HpHp- β -ImIm- γ -PyPyHpPyPy
	1067 β p) 5'-W T T A G G W-3'	HpHp- β -ImIm- γ -PyPy- β -PyPy
	1068 β) 5'-W T T A G C W-3'	HpHp- β -ImPy- γ -ImPyHpPyPy
	1068 β p) 5'-W T T A G C W-3'	HpHp- β -ImPy- γ -ImPy- β -PyPy
30	1071 β) 5'-W T T A C G W-3'	HpHp- β -PyIm- γ -PyImHpPyPy
	1071 β p) 5'-W T T A C G W-3'	HpHp- β -PyIm- γ -PyIm- β -PyPy

TABLE 79: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTSNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
	1073 β) 5'-W T T G T T W-3'	Hp- β -ImHpHp- γ -PyPyPyPyPy
5	1073 β p) 5'-W T T G T T W-3'	Hp- β -ImHpHp- γ -PyPyPyPy- β -Py
	1074 β) 5'-W T T G T A W-3'	Hp- β -ImHpPy- γ -HpPyPyPyPy
	1074 β p) 5'-W T T G T A W-3'	Hp- β -ImHpPy- γ -HpPyPy- β -Py
	1075 β) 5'-W T T G T G W-3'	Hp- β -ImHpIm- γ -PyPyPyPyPy
	1075 β p) 5'-W T T G T G W-3'	Hp- β -ImHpIm- γ -PyPyPy- β -Py
10	1076 β) 5'-W T T G T C W-3'	Hp- β -ImHpPy- γ -ImPyPyPyPy
	1076 β p) 5'-W T T G T C W-3'	Hp- β -ImHpPy- γ -ImPyPy- β -Py
	1077 β) 5'-W T T G A T W-3'	Hp- β -ImPyHp- γ -PyHpPyPyPy
	1077 β p) 5'-W T T G A T W-3'	Hp- β -ImPyHp- γ -PyHpPy- β -Py
	1078 β) 5'-W T T G A A W-3'	Hp- β -ImPyPy- γ -HpHpPyPyPy
15	1078 β p) 5'-W T T G A A W-3'	Hp- β -ImPyPy- γ -HpHpPy- β -Py
	1079 β) 5'-W T T G A G W-3'	Hp- β -ImPyIm- γ -PyHpPyPy
	1079 β p) 5'-W T T G A G W-3'	Hp- β -ImPyIm- γ -PyHpPy- β -Py
	1080 β) 5'-W T T G A C W-3'	Hp- β -ImPyPy- γ -ImHpPyPy
	1080 β p) 5'-W T T G A C W-3'	Hp- β -ImPyPy- γ -ImHpPy- β -Py
20	1081 β) 5'-W T T G G T W-3'	Hp- β -ImImHp- γ -PyPyPyPy
	1081 β p) 5'-W T T G G T W-3'	Hp- β -ImImHp- γ -PyPyPy- β -Py
	1082 β) 5'-W T T G G A W-3'	Hp- β -ImImPy- γ -HpPyPyPy
	1082 β p) 5'-W T T G G A W-3'	Hp- β -ImImPy- γ -HpPyPy- β -Py
	1083 β) 5'-W T T G C T W-3'	Hp- β -ImPyHp- γ -PyImPyPy
25	1083 β p) 5'-W T T G C T W-3'	Hp- β -ImPyHp- γ -PyImPy- β -Py
	1084 β) 5'-W T T G C A W-3'	Hp- β -ImPyPy- γ -HpImPyPy
	1084 β p) 5'-W T T G C A W-3'	Hp- β -ImPyPy- γ -HpImPy- β -Py
	1085 β) 5'-W T T G G G W-3'	Hp- β -ImImIm- γ -PyPyPyPy
	1085 β p) 5'-W T T G G G W-3'	Hp- β -ImImIm- γ -PyPyPy- β -Py
30	1086 β) 5'-W T T G G C W-3'	Hp- β -ImImPy- γ -ImPyPyPy
	1086 β p) 5'-W T T G G C W-3'	Hp- β -ImImPy- γ -ImPyPy- β -Py
	1087 β) 5'-W T T G C G W-3'	Hp- β -ImPyIm- γ -PyImPyPy
	1087 β p) 5'-W T T G C G W-3'	Hp- β -ImPyIm- γ -PyImPy- β -Py

TABLE 79 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTTSNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
	1088 β) 5'-W T T G C C W-3'	Hp- β -ImPyPy- γ -ImImPyPyPy
5	1088 β p) 5'-W T T G C C W-3'	Hp- β -ImPyPy- γ -ImImPy- β -Py
	1089 β) 5'-W T T C T T W-3'	HpHpPyHpH γ -Py- β -ImPyPy
	1089 β p) 5'-W T T C T T W-3'	HpHpPy- β -H γ -Py- β -ImPyPy
	1090 β) 5'-W T T C T A W-3'	HpHpPyHpPy- γ -H β -ImPyPy
	1090 β p) 5'-W T T C T A W-3'	HpHpPy- β -Py- γ -H β -ImPyPy
10	1091 β) 5'-W T T C T G W-3'	HpH β -H γ -Py- β -ImPyPy
	1092 β) 5'-W T T C T C W-3'	HpHpPyHpPy- γ -Im- β -ImPyPy
	1092 β p) 5'-W T T C T C W-3'	HpHpPy- β -Py- γ -Im- β -ImPyPy
	1093 β) 5'-W T T C A T W-3'	HpHpPyPyH γ -Py- β -ImPyPy
	1093 β p) 5'-W T T C A T W-3'	HpHpPy- β -H γ -Py- β -ImPyPy
15	1094 β) 5'-W T T C A A W-3'	HpHpPyPyPy- γ -H β -ImPyPy
	1094 β p) 5'-W T T C A A W-3'	HpHpPy- β -Py- γ -H β -ImPyPy
	1095 β) 5'-W T T C A G W-3'	HpH β -PyIm- γ -Py- β -ImPyPy
	1096 β) 5'-W T T C A C W-3'	HpHpPyPyPy- γ -Im- β -ImPyPy
	1096 β p) 5'-W T T C A C W-3'	HpHpPy- β -Py- γ -Im- β -ImPyPy
20	1097 β) 5'-W T T C G T W-3'	HpH β -ImH γ -Py- β -ImPyPy
	1098 β) 5'-W T T C G A W-3'	HpHp- β -ImPy- γ -H β -ImPyPy
	1099 β) 5'-W T T C C T W-3'	HpHpPyPyH γ -PyImIm- β -Py
	1099 β p) 5'-W T T C C T W-3'	Hp- β -PyPyH γ -PyImIm- β -Py
	1100 β) 5'-W T T C C A W-3'	HpHpPyPyPy- γ -H β ImIm- β -Py
25	1100 β p) 5'-W T T C C A W-3'	Hp- β -PyPyPy- γ -H β ImIm- β -Py
	1101 β) 5'-W T T C G G W-3'	HpHp- β -ImIm- γ -Py- β -ImPyPy
	1102 β) 5'-W T T C G C W-3'	HpHp- β -ImPy- γ -Im- β -ImPyPy
	1103 β) 5'-W T T C C G W-3'	HpHp- β -PyIm- γ -PyImIm- β -Py

TABLE 80: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTA_nW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
5	1107 β) 5'-W T A T T G W-3' 1107 β p) 5'-W T A T T G W-3'	HpPy- β -HpIm- γ -PyPyPyHpPy HpPy- β -HpIm- γ -PyPy- β -HpPy
	1111 β) 5'-W T A T A G W-3' 1111 β p) 5'-W T A T A G W-3'	HpPy- β -PyIm- γ -PyHpPyHpPy HpPy- β -PyIm- γ -PyHp- β -HpPy
10	1113 β) 5'-W T A T G T W-3' 1113 β p) 5'-W T A T G T W-3'	HpPy- β -ImHp- γ -PyPyPyHpPy HpPy- β -ImHp- γ -PyPy- β -HpPy
	1114 β) 5'-W T A T G A W-3' 1114 β p) 5'-W T A T G A W-3'	HpPy- β -ImPy- γ -HpPyPyHpPy HpPy- β -ImPy- γ -HpPy- β -HpPy
15	1115 β) 5'-W T A T G G W-3' 1115 β p) 5'-W T A T G G W-3'	HpPy- β -ImIm- γ -PyPyPyHpPy HpPy- β -ImIm- γ -PyPy- β -HpPy
	1116 β) 5'-W T A T G C W-3' 1116 β p) 5'-W T A T G C W-3'	HpPy- β -ImPy- γ -ImPyPyHpPy HpPy- β -ImPy- γ -ImPy- β -HpPy
20	1119 β) 5'-W T A T C G W-3' 1119 β p) 5'-W T A T C G W-3'	HpPy- β -PyIm- γ -PyImPyHpPy HpPy- β -PyIm- γ -PyIm- β -HpPy
	1123 β) 5'-W T A A T G W-3' 1123 β p) 5'-W T A A T G W-3'	HpPy- β -HpIm- γ -PyPyHpPy HpPy- β -HpIm- γ -PyPy- β -HpPy
25	1127 β) 5'-W T A A A G W-3' 1127 β p) 5'-W T A A A G W-3'	HpPy- β -PyIm- γ -PyHpPyHpPy HpPy- β -PyIm- γ -PyHp- β -HpPy
	1129 β) 5'-W T A A G T W-3' 1129 β p) 5'-W T A A G T W-3'	HpPy- β -ImHp- γ -PyPyHpPy HpPy- β -ImHp- γ -PyPy- β -HpPy
30	1130 β) 5'-W T A A G A W-3' 1130 β p) 5'-W T A A G A W-3'	HpPy- β -ImPy- γ -HpPyHpPy HpPy- β -ImPy- γ -HpPy- β -HpPy
	1131 β) 5'-W T A A G G W-3' 1131 β p) 5'-W T A A G G W-3'	HpPy- β -ImIm- γ -PyPyHpPy HpPy- β -ImIm- γ -PyPy- β -HpPy
	1132 β) 5'-W T A A G C W-3' 1132 β p) 5'-W T A A G C W-3'	HpPy- β -ImPy- γ -ImPyHpPy HpPy- β -ImPy- γ -ImPy- β -HpPy
	1135 β) 5'-W T A A C G W-3' 1135 β p) 5'-W T A A C G W-3'	HpPy- β -PyIm- γ -PyImHpPy HpPy- β -PyIm- γ -PyIm- β -HpPy

TABLE 81: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTASNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
5	1137 β) 5'-W T A G T T W-3'	Hp- β -ImHpHp- γ -PyPyPyHpPy
	1137 β p) 5'-W T A G T T W-3'	Hp- β -ImHpHp- γ -PyPyPy- β -Py
	1138 β) 5'-W T A G T A W-3'	Hp- β -ImHpPy- γ -HpPyPyHpPy
	1138 β p) 5'-W T A G T A W-3'	Hp- β -ImHpPy- γ -HpPyPy- β -Py
10	1139 β) 5'-W T A G T G W-3'	Hp- β -ImHpIm- γ -PyPyPyHpPy
	1139 β p) 5'-W T A G T G W-3'	Hp- β -ImHpIm- γ -PyPyPy- β -Py
	1140 β) 5'-W T A G T C W-3'	Hp- β -ImHpPy- γ -ImPyPyHpPy
	1140 β p) 5'-W T A G T C W-3'	Hp- β -ImHpPy- γ -ImPyPy- β -Py
	1141 β) 5'-W T A G A T W-3'	Hp- β -ImPyHp- γ -PyHpPyHpPy
	1141 β p) 5'-W T A G A T W-3'	Hp- β -ImPyHp- γ -PyHpPy- β -Py
	1142 β) 5'-W T A G A A W-3'	Hp- β -ImPyPy- γ -HpHpPyHpPy
15	1142 β p) 5'-W T A G A A W-3'	Hp- β -ImPyPy- γ -HpHpPy- β -Py
	1143 β) 5'-W T A G A G W-3'	Hp- β -ImPyIm- γ -PyHpPyHpPy
	1143 β p) 5'-W T A G A G W-3'	Hp- β -ImPyIm- γ -PyHpPy- β -Py
	1144 β) 5'-W T A G A C W-3'	Hp- β -ImPyPy- γ -ImHpPyHpPy
	1144 β p) 5'-W T A G A C W-3'	Hp- β -ImPyPy- γ -ImHpPy- β -Py
20	1145 β) 5'-W T A G G T W-3'	Hp- β -ImImHp- γ -PyPyPyHpPy
	1145 β p) 5'-W T A G G T W-3'	Hp- β -ImImHp- γ -PyPyPy- β -Py
	1146 β) 5'-W T A G G A W-3'	Hp- β -ImImPy- γ -HpPyPyHpPy
	1146 β p) 5'-W T A G G A W-3'	Hp- β -ImImPy- γ -HpPyPy- β -Py
	1147 β) 5'-W T A G C T W-3'	Hp- β -ImPyHp- γ -PyImPyHpPy
25	1147 β p) 5'-W T A G C T W-3'	Hp- β -ImPyHp- γ -PyImPy- β -Py
	1148 β) 5'-W T A G C A W-3'	Hp- β -ImPyPy- γ -HpImPyHpPy
	1148 β p) 5'-W T A G C A W-3'	Hp- β -ImPyPy- γ -HpImPy- β -Py
	1149 β) 5'-W T A G G G W-3'	Hp- β -ImImIm- γ -PyPyPyHpPy
	1149 β p) 5'-W T A G G G W-3'	Hp- β -ImImIm- γ -PyPyPy- β -Py
30	1150 β) 5'-W T A G G C W-3'	Hp- β -ImImPy- γ -ImPyPyHpPy
	1150 β p) 5'-W T A G G C W-3'	Hp- β -ImImPy- γ -ImPyPy- β -Py
	1151 β) 5'-W T A G C G W-3'	Hp- β -ImPyIm- γ -PyImPyHpPy
	1151 β p) 5'-W T A G C G W-3'	Hp- β -ImPyIm- γ -PyImPy- β -Py

TABLE 81 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTASNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
5	1152 β) 5'-W T A G C C W-3'	Hp- β -ImPyPy- γ -ImImPyHpPy
	1152 β p) 5'-W T A G C C W-3'	Hp- β -ImPyPy- γ -ImImPy- β -Py
	1153 β) 5'-W T A C T T W-3'	HpPyPyHpH β - γ -Py- β -ImH β Py
	1153 β p) 5'-W T A C T T W-3'	HpPyPy- β -H β - γ -Py- β -ImH β Py
10	1154 β) 5'-W T A C T A W-3'	HpPyPyHpPy- γ -H β - β -ImH β Py
	1154 β p) 5'-W T A C T A W-3'	HpPyPy- β -Py- γ -H β - β -ImH β Py
	1155 β) 5'-W T A C T G W-3'	HpPy- β -H β Im- γ -Py- β -ImH β Py
	1156 β) 5'-W T A C T C W-3'	HpPyPyHpPy- γ -Im- β -ImH β Py
	1156 β p) 5'-W T A C T C W-3'	HpPyPy- β -Py- γ -Im- β -ImH β Py
	1157 β) 5'-W T A C A T W-3'	HpPyPyPyH β - γ -Py- β -ImH β Py
	1157 β p) 5'-W T A C A T W-3'	HpPyPy- β -H β - γ -Py- β -ImH β Py
15	1158 β) 5'-W T A C A A W-3'	HpPyPyPyPy- γ -H β - β -ImH β Py
	1158 β p) 5'-W T A C A A W-3'	HpPyPy- β -Py- γ -H β - β -ImH β Py
	1159 β) 5'-W T A C A G W-3'	HpPy- β -PyIm- γ -Py- β -ImH β Py
	1160 β) 5'-W T A C A C W-3'	HpPyPyPyPy- γ -Im- β -ImH β Py
	1160 β p) 5'-W T A C A C W-3'	HpPyPy- β -Py- γ -Im- β -ImH β Py
20	1161 β) 5'-W T A C G T W-3'	HpPy- β -ImH β - γ -Py- β -ImH β Py
	1162 β) 5'-W T A C G A W-3'	HpPy- β -ImPy- γ -H β - β -ImH β Py
	1163 β) 5'-W T A C C T W-3'	HpPyPyPyH β - γ -PyImIm- β -Py
	1163 β p) 5'-W T A C C T W-3'	Hp- β -PyPyH β - γ -PyImIm- β -Py
	1164 β) 5'-W T A C C A W-3'	HpPyPyPyPy- γ -H β ImIm- β -Py
25	1164 β p) 5'-W T A C C A W-3'	Hp- β -PyPyPy- γ -H β ImIm- β -Py
	1165 β) 5'-W T A C G G W-3'	HpPy- β -ImIm- γ -Py- β -ImH β Py
	1166 β) 5'-W T A C G C W-3'	HpPy- β -ImPy- γ -Im- β -ImH β Py
	1167 β) 5'-W T A C C G W-3'	HpPy- β -PyIm- γ -PyImIm- β -Py

TABLE 82: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCWNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
5	1170 β) 5'-W T C T T A W-3'	HpPyHpPy- γ -HpPy- β -ImPy
	1170 β p) 5'-W T C T T A W-3'	HpPy- β -HpPy- γ -HpPy- β -ImPy
	1171 β) 5'-W T C T T G W-3'	HpPy- β -HpIm- γ -PyPy- β -ImPy
	1172 β) 5'-W T C T T C W-3'	HpPyHpPy- γ -ImPy- β -ImPy
	1172 β p) 5'-W T C T T C W-3'	HpPy- β -HpPy- γ -ImPy- β -ImPy
	1173 β) 5'-W T C T A T W-3'	HpPyHpPyHp- γ -PyHp- β -ImPy
10	1173 β p) 5'-W T C T A T W-3'	HpPy- β -PyHp- γ -PyHp- β -ImPy
	1174 β) 5'-W T C T A A W-3'	HpPyHpPyPy- γ -HpHp- β -ImPy
	1174 β p) 5'-W T C T A A W-3'	HpPy- β -PyPy- γ -HpHp- β -ImPy
	1175 β) 5'-W T C T A G W-3'	HpPy- β -PyIm- γ -PyHp- β -ImPy
	1176 β) 5'-W T C T A C W-3'	HpPyHpPyPy- γ -ImHp- β -ImPy
15	1176 β p) 5'-W T C T A C W-3'	HpPy- β -PyPy- γ -ImHp- β -ImPy
	1177 β) 5'-W T C T G T W-3'	HpPy- β -ImHp- γ -PyPy- β -ImPy
	1178 β) 5'-W T C T G A W-3'	HpPy- β -ImPy- γ -HpPy- β -ImPy
	1179 β) 5'-W T C T G G W-3'	HpPy- β -ImIm- γ -PyPy- β -ImPy
	1180 β) 5'-W T C T G C W-3'	HpPy- β -ImPy- γ -ImPy- β -ImPy
20	1181 β) 5'-W T C T C T W-3'	HpPyHpPyHp- γ -PyIm- β -ImPy
	1181 β p) 5'-W T C T C T W-3'	HpPy- β -PyHp- γ -PyIm- β -ImPy
	1182 β) 5'-W T C T C A W-3'	HpPyHpPyPy- γ -HpIm- β -ImPy
	1182 β p) 5'-W T C T C A W-3'	HpPy- β -PyPy- γ -HpIm- β -ImPy
	1183 β) 5'-W T C T C G W-3'	HpPy- β -PyIm- γ -PyIm- β -ImPy
25	1184 β) 5'-W T C T C C W-3'	HpPyHpPyPy- γ -ImIm- β -ImPy
	1184 β p) 5'-W T C T C C W-3'	HpPy- β -PyPy- γ -ImIm- β -ImPy
	1185 β) 5'-W T C A T T W-3'	HpPyPyHpH- γ -PyPy- β -ImPy
	1185 β p) 5'-W T C A T T W-3'	HpPy- β -HpH- γ -PyPy- β -ImPy
	1186 β) 5'-W T C A T A W-3'	HpPyPyHpPy- γ -HpPy- β -ImPy
30	1186 β p) 5'-W T C A T A W-3'	HpPy- β -HpPy- γ -HpPy- β -ImPy
	1187 β) 5'-W T C A T G W-3'	HpPy- β -HpIm- γ -PyPy- β -ImPy

TABLE 82 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCWNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
	1188β) 5'-W T C A T C W-3'	HpPyPyHpPy- γ -ImPy- β -ImPy
5	1188βp) 5'-W T C A T C W-3'	HpPy- β -HpPy- γ -ImPy- β -ImPy
	1189β) 5'-W T C A A T W-3'	HpPyPyPyHp- γ -PyHp- β -ImPy
	1189βp) 5'-W T C A A T W-3'	HpPy- β -PyHp- γ -PyHp- β -ImPy
	1190β) 5'-W T C A A A W-3'	HpPyPyPyPy- γ -HpHp- β -ImPy
	1190βp) 5'-W T C A A A W-3'	HpPy- β -PyPy- γ -HpHp- β -ImPy
10	1191β) 5'-W T C A A G W-3'	HpPy- β -PyIm- γ -PyHp- β -ImPy
	1192β) 5'-W T C A A C W-3'	HpPyPyPyPy- γ -ImHp- β -ImPy
	1192βp) 5'-W T C A A C W-3'	HpPy- β -PyPy- γ -ImHp- β -ImPy
	1193β) 5'-W T C A G T W-3'	HpPy- β -ImHp- γ -PyPy- β -ImPy
	1194β) 5'-W T C A G A W-3'	HpPy- β -ImPy- γ -HpPy- β -ImPy
15	1195β) 5'-W T C A G G W-3'	HpPy- β -ImIm- γ -PyPy- β -ImPy
	1196β) 5'-W T C A G C W-3'	HpPy- β -ImPy- γ -ImPy- β -ImPy
	1197β) 5'-W T C A C T W-3'	HpPyPyPyHp- γ -PyIm- β -ImPy
	1197βp) 5'-W T C A C T W-3'	HpPy- β -PyHp- γ -PyIm- β -ImPy
	1198β) 5'-W T C A C A W-3'	HpPyPyPyPy- γ -HpIm- β -ImPy
20	1198βp) 5'-W T C A C A W-3'	HpPy- β -PyPy- γ -HpIm- β -ImPy
	1199β) 5'-W T C A C G W-3'	HpPy- β -PyIm- γ -PyIm- β -ImPy
	1200β) 5'-W T C A C C W-3'	HpPyPyPyPy- γ -ImIm- β -ImPy
	1200βp) 5'-W T C A C C W-3'	HpPy- β -PyPy- γ -ImIm- β -ImPy

TABLE 83: 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCSNNW-3' with β substitutions

	DNA sequence	aromatic amino acid sequence
5	1201 β) 5'-W T C G T T W-3'	Hp- β -ImHpHp- γ -PyPy- β -ImPy
	1202 β) 5'-W T C G T A W-3'	Hp- β -ImHpPy- γ -HpPy- β -ImPy
	1203 β) 5'-W T C G T G W-3'	Hp- β -ImHpIm- γ -PyPy- β -ImPy
	1204 β) 5'-W T C G T C W-3'	Hp- β -ImHpPy- γ -ImPy- β -ImPy
	1205 β) 5'-W T C G A T W-3'	Hp- β -ImPyHp- γ -PyHp- β -ImPy
	1206 β) 5'-W T C G A A W-3'	Hp- β -ImPyPy- γ -HpHp- β -ImPy
10	1207 β) 5'-W T C G A G W-3'	Hp- β -ImPyIm- γ -PyHp- β -ImPy
	1208 β) 5'-W T C G A C W-3'	Hp- β -ImPyPy- γ -ImHp- β -ImPy
	1209 β) 5'-W T C G G T W-3'	Hp- β -ImImHp- γ -PyPy- β -ImPy
	1210 β) 5'-W T C G G A W-3'	Hp- β -ImImPy- γ -HpPy- β -ImPy
	1211 β) 5'-W T C G C T W-3'	Hp- β -ImPyHp- γ -PyIm- β -ImPy
15	1212 β) 5'-W T C G C A W-3'	Hp- β -ImPyPy- γ -HpIm- β -ImPy
	1213 β) 5'-W T C C T T W-3'	HpPyPyHpHp- γ -Py- β -ImImPy
	1213 β p) 5'-W T C C T T W-3'	HpPyPy- β -Hp- γ -Py- β -ImImPy
	1214 β) 5'-W T C C T A W-3'	HpPyPyHpPy- γ -Hp- β -ImImPy
	1214 β p) 5'-W T C C T A W-3'	HpPyPy- β -Py- γ -Hp- β -ImImPy
20	1215 β) 5'-W T C C T G W-3'	HpPy- β -HpIm- γ -Py- β -ImImPy
	1216 β) 5'-W T C C T C W-3'	HpPyPyHpPy- γ -Im- β -ImImPy
	1216 β p) 5'-W T C C T C W-3'	HpPyPy- β -Py- γ -Im- β -ImImPy
	1217 β) 5'-W T C C A T W-3'	HpPyPyPyHp- γ -Py- β -ImImPy
	1217 β p) 5'-W T C C A T W-3'	HpPyPy- β -Hp- γ -Py- β -ImImPy
25	1218 β) 5'-W T C C A A W-3'	HpPyPyPyPy- γ -Hp- β -ImImPy
	1218 β p) 5'-W T C C A A W-3'	HpPyP- β -Py- γ -Hp- β -ImImPy
	1219 β) 5'-W T C C A G W-3'	HpPy- β -PyIm- γ -Py- β -ImImPy
	1220 β) 5'-W T C C A C W-3'	HpPyPyPyPy- γ -Im- β -ImImPy
	1220 β p) 5'-W T C C A C W-3'	HpPyPy- β -Py- γ -Im- β -ImImPy
30	1221 β) 5'-W T C C G T W-3'	HpPy- β -ImHp- γ -Py- β -ImImPy
	1222 β) 5'-W T C C G A W-3'	HpPy- β -ImPy- γ -Hp- β -ImImPy
	1225 β) 5'-W T C G G G W-3'	Hp- β -ImImIm- γ -PyPy- β -ImPy

TABLE 83 (cont): 10-ring Hairpin Polyamides for recognition of 7-bp 5'-WTCSNNW-3' with β substitutions

DNA sequence	aromatic amino acid sequence
1226 β) 5'-W T C G G C W-3'	Hp- β -ImImPy- γ -ImPy- β -ImPy
1227 β) 5'-W T C G C G W-3'	Hp- β -ImPyIm- γ -PyIm- β -ImPy
1228 β) 5'-W T C G C C W-3'	Hp- β -ImPyPy- γ -ImIm- β -ImPy
1229 β) 5'-W T C C G G W-3'	HpPy- β -ImIm- γ -Py- β -ImImPy
1230 β) 5'-W T C C G C W-3'	HpPy- β -ImPy- γ -Im- β -ImImPy
1231 β) 5'-W T C C C G W-3'	HpPy- β -PyIm- γ -PyImImPy

10

If the process described above of designing a preferred polyamide molecule comprising four or five carboxamide binding pairs does not produce a selective polyamide that binds to the target identified DNA sequence with subnanomolar affinity and with a selectivity over mismatch sequences of greater than a factor of ten, a polyamide molecule

15 X₁X₂X₃X₄X₅X₆- γ -X₇X₈X₉X₁₀X₁₁X₁₂ having six carboxamide binding pairs can be designed that is selective for an eight base pair identified target 5'-WN>NNNNNW-3' sequence. The design and synthesis of six binding pair polyamides is essentially the same as that of the 20 four and five binding pair polyamides described above.

The polyamide design process for six carboxamide binding pair polyamides is shown schematically in Figure 10 A and the upper half of 10B. The method for choosing the residues that can be replaced by a β -alanine residue is shown schematically in the lower half of Figure 10 25 B and in Figure 11. The 1024 possible 12-ring hairpins which target the 1024 5'-GN>NNNN-3' core sequences are listed in Tables 84-115. Each DNA sequence entry can be correlated to its corresponding polyamide recognition sequence using the process outlined in this figure. The 1024 possible 12-ring hairpins which target the 1024 5'-CNNNNN-3' core sequences are listed in Tables 116-147. Each DNA sequence entry can be correlated to its corresponding polyamide 30 recognition sequence using the process outlined in this figure.

Figure 11 shows a process for replacement of aromatic amino acid residues with aliphatic β -alanine 'spring' residues in order to enhance the DNA binding properties of 12-ring hairpin polyamides. Selective placement of an aliphatic β -alanine (β) residue paired side-by-side with either a pyrrole (Py) or imidazole (Im) aromatic amino acid or another β -alanine residue is found 35

-132-

to compensate for sequence composition effects for recognition of the minor groove of DNA by hairpin pyrrole-imidazole polyamides. If an all-ring polyamide has been found to have an affinity which is not subnanomolar, or a specificity versus mismatch sequences which is less than 10-fold it may be caused by DNA sequence-composition effects which can be tuned out by
5 replacement of an aromatic amino acid with an aliphatic β -alanine spring. Rules have been determined to help determine the exact placement of the β -spring residues. For example, within the 12-ring template, it is only beneficial to place β -alanine within positions X₂, X₃, X₄, X₅, X₈, X₉, and X₁₀ X₁₁. No more than two β -alanine residues may be placed within a single hairpin structure. No more than a single β -residue may be placed within each individual
10 polyamide subunit. Tables 148-1079 list derivatives of sequences (1233-2224) labeled (1223 β -2224 β) which contain two β -alanine residues assigned according to the process outlined in Figure 11A & B.

TABLE 84: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1233) 5'-W G G G T T T W-3'	I _m I _m I _m H _p H _p H _p -γ-PyPyPyPyPyPy
5	1234) 5'-W G G G T T A W-3'	I _m I _m I _m H _p H _p Py-γ-HpPyPyPyPyPy
	1235) 5'-W G G G T T G W-3'	I _m I _m I _m H _p H _p I _m -γ-PyPyPyPyPyPy
	1236) 5'-W G G G T T C W-3'	I _m I _m I _m H _p Py-γ-I _m PyPyPyPyPy
	1237) 5'-W G G G T A T W-3'	I _m I _m I _m H _p PyH _p -γ-PyH _p PyPyPyPy
	1238) 5'-W G G G T A A W-3'	I _m I _m I _m H _p Py-γ-HpH _p PyPyPyPy
10	1239) 5'-W G G G T A G W-3'	I _m I _m I _m H _p PyI _m -γ-PyH _p PyPyPyPy
	1240) 5'-W G G G T A C W-3'	I _m I _m I _m H _p PyPy-γ-I _m H _p PyPyPyPy
	1241) 5'-W G G G T G T W-3'	I _m I _m I _m H _p I _m H _p -γ-PyPyPyPyPyPy
	1242) 5'-W G G G T G A W-3'	I _m I _m I _m H _p I _m Py-γ-HpPyPyPyPyPy
	1243) 5'-W G G G T G G W-3'	I _m I _m I _m H _p I _m I _m -γ-PyPyPyPyPy
15	1244) 5'-W G G G T G C W-3'	I _m I _m I _m H _p I _m Py-γ-I _m PyPyPyPyPy
	1245) 5'-W G G G T C T W-3'	I _m I _m I _m H _p PyH _p -γ-PyI _m PyPyPyPy
	1246) 5'-W G G G T C A W-3'	I _m I _m I _m H _p PyPy-γ-HpI _m PyPyPyPy
	1247) 5'-W G G G T C G W-3'	I _m I _m I _m H _p PyI _m -γ-PyI _m PyPyPyPy
	1248) 5'-W G G G T C C W-3'	I _m I _m I _m H _p PyPy-γ-I _m I _m PyPyPyPy
20	1249) 5'-W G G G A T T W-3'	I _m I _m I _m PyH _p H _p -γ-PyPyH _p PyPy
	1250) 5'-W G G G A T A W-3'	I _m I _m I _m PyH _p Py-γ-HpPyH _p PyPy
	1251) 5'-W G G G A T G W-3'	I _m I _m I _m PyH _p I _m -γ-PyPyH _p PyPy
	1252) 5'-W G G G A T C W-3'	I _m I _m I _m PyH _p Py-γ-I _m PyH _p PyPy
	1253) 5'-W G G G A A T W-3'	I _m I _m I _m PyH _p -γ-PyH _p H _p PyPy
25	1254) 5'-W G G G A A A W-3'	I _m I _m I _m PyPyPy-γ-HpH _p H _p PyPy
	1255) 5'-W G G G A A G W-3'	I _m I _m I _m PyPyI _m -γ-PyH _p H _p PyPy
	1256) 5'-W G G G A A C W-3'	I _m I _m I _m PyPyPy-γ-I _m H _p H _p PyPy
	1257) 5'-W G G G A G T W-3'	I _m I _m I _m PyI _m H _p -γ-PyPyH _p PyPy
	1258) 5'-W G G G A G A W-3'	I _m I _m I _m PyI _m Py-γ-HpPyH _p PyPy
30	1259) 5'-W G G G A G G W-3'	I _m I _m I _m PyI _m I _m -γ-PyPyH _p PyPy
	1260) 5'-W G G G A G C W-3'	I _m I _m I _m PyI _m Py-γ-I _m PyH _p PyPy
	1261) 5'-W G G G A C T W-3'	I _m I _m I _m PyPyH _p -γ-PyI _m H _p PyPy
	1262) 5'-W G G G A C A W-3'	I _m I _m I _m PyPyPy-γ-HpI _m H _p PyPy
	1263) 5'-W G G G A C G W-3'	I _m I _m I _m PyI _m -γ-PyI _m H _p PyPy
35	1264) 5'-W G G G A C C W-3'	I _m I _m I _m PyPyPy-γ-I _m I _m H _p PyPy

TABLE 85: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
1265)	5'-W G G G G T T W-3'	I _m I _m I _m I _m H _p H _p -γ-PyPyPyPyPyPy
1266)	5'-W G G G G T A W-3'	I _m I _m I _m I _m H _p Py-γ-HpPyPyPyPyPy
1267)	5'-W G G G G T G W-3'	I _m I _m I _m I _m H _p I _m -γ-PyPyPyPyPyPy
1268)	5'-W G G G G T C W-3'	I _m I _m I _m I _m H _p Py-γ-I _m PyPyPyPyPy
1269)	5'-W G G G G A T W-3'	I _m I _m I _m I _m P _y H _p -γ-PyH _p PyPyPy
1270)	5'-W G G G G A A W-3'	I _m I _m I _m I _m P _y Py-γ-HpH _p PyPyPy
1271)	5'-W G G G G A G W-3'	I _m I _m I _m I _m P _y I _m -γ-PyH _p PyPyPy
1272)	5'-W G G G G A C W-3'	I _m I _m I _m I _m P _y Py-γ-I _m H _p PyPyPy
1273)	5'-W G G G G G T W-3'	I _m I _m I _m I _m I _m H _p -γ-PyPyPyPyPy
1274)	5'-W G G G G G A W-3'	I _m I _m I _m I _m I _m P _y -γ-HpPyPyPyPy
1275)	5'-W G G G G C T W-3'	I _m I _m I _m I _m P _y H _p -γ-PyI _m PyPyPy
1276)	5'-W G G G G C A W-3'	I _m I _m I _m I _m P _y Py-γ-HpI _m PyPyPy
1277)	5'-W G G G C T T W-3'	I _m I _m I _m P _y H _p H _p -γ-PyPyI _m PyPy
1278)	5'-W G G G C T A W-3'	I _m I _m I _m P _y H _p Py-γ-HpPyI _m PyPy
1279)	5'-W G G G C T G W-3'	I _m I _m I _m P _y H _p I _m -γ-PyPyI _m PyPy
1280)	5'-W G G G C T C W-3'	I _m I _m I _m P _y H _p Py-γ-I _m PyI _m PyPy
1281)	5'-W G G G C A T W-3'	I _m I _m I _m P _y H _p -γ-PyH _p I _m PyPy
1282)	5'-W G G G C A A W-3'	I _m I _m I _m P _y PyPy-γ-HpH _p I _m PyPy
1283)	5'-W G G G C A G W-3'	I _m I _m I _m P _y I _m -γ-PyH _p I _m PyPy
1284)	5'-W G G G C A C W-3'	I _m I _m I _m P _y PyPy-γ-I _m H _p I _m PyPy
1285)	5'-W G G G C G T W-3'	I _m I _m I _m P _y I _m H _p -γ-PyPyI _m PyPy
1286)	5'-W G G G C G A W-3'	I _m I _m I _m P _y I _m Py-γ-HpPyI _m PyPy
1287)	5'-W G G G C C T W-3'	I _m I _m I _m P _y H _p -γ-PyI _m I _m PyPy
1288)	5'-W G G G C C A W-3'	I _m I _m I _m P _y PyPy-γ-HpI _m I _m PyPy
G49)	5'-W G G G G G G W-3'	I _m I _m I _m I _m I _m -γ-PyPyPyPyPy
G50)	5'-W G G G G G C W-3'	I _m I _m I _m I _m I _m P _y -γ-I _m PyPyPyPy
G51)	5'-W G G G G C G W-3'	I _m I _m I _m I _m P _y I _m -γ-PyI _m PyPy
G52)	5'-W G G G G C C W-3'	I _m I _m I _m I _m P _y Py-γ-I _m I _m PyPy
G53)	5'-W G G G C G G W-3'	I _m I _m I _m I _m P _y I _m I _m -γ-PyI _m PyPy
G54)	5'-W G G G C G C W-3'	I _m I _m I _m I _m P _y I _m Py-γ-I _m PyI _m Py
G55)	5'-W G G G C C G W-3'	I _m I _m I _m I _m P _y I _m -γ-PyI _m I _m PyPy
G56)	5'-W G G G C C C W-3'	I _m I _m I _m I _m P _y Py-γ-I _m I _m I _m PyPy

TABLE 86: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1289) 5'-W G G T T T T W-3'	I _m I _m H _p H _p H _p H _p -γ-PyPyPyPyPyPy
5	1290) 5'-W G G T T T T A W-3'	I _m I _m H _p H _p H _p H _p Py-γ-HpPyPyPyPyPy
	1291) 5'-W G G T T T G W-3'	I _m I _m H _p H _p H _p I _m -γ-PyPyPyPyPyPy
	1292) 5'-W G G T T T C W-3'	I _m I _m H _p H _p H _p Py-γ-I _m PyPyPyPyPy
	1293) 5'-W G G T T A T W-3'	I _m I _m H _p H _p PyH _p -γ-PyH _p PyPyPy
	1294) 5'-W G G T T A A W-3'	I _m I _m H _p H _p PyPy-γ-HpH _p PyPyPy
10	1295) 5'-W G G T T A G W-3'	I _m I _m H _p H _p PyI _m -γ-PyH _p PyPyPy
	1296) 5'-W G G T T A C W-3'	I _m I _m H _p H _p PyPy-γ-I _m H _p PyPyPy
	1297) 5'-W G G T T G T W-3'	I _m I _m H _p H _p I _m H _p -γ-PyPyPyPyPy
	1298) 5'-W G G T T G A W-3'	I _m I _m H _p H _p I _m Py-γ-HpPyPyPy
	1299) 5'-W G G T T G G W-3'	I _m I _m H _p H _p I _m I _m -γ-PyPyPyPy
15	1300) 5'-W G G T T G C W-3'	I _m I _m H _p H _p I _m Py-γ-I _m PyPyPy
	1301) 5'-W G G T T C T W-3'	I _m I _m H _p H _p PyH _p -γ-PyI _m PyPy
	1302) 5'-W G G T T C A W-3'	I _m I _m H _p H _p PyPy-γ-HpI _m PyPy
	1303) 5'-W G G T T C G W-3'	I _m I _m H _p H _p PyI _m -γ-PyI _m PyPy
	1304) 5'-W G G T T C C W-3'	I _m I _m H _p H _p PyPy-γ-I _m I _m PyPy
20	1305) 5'-W G G T A T T W-3'	I _m I _m H _p PyH _p H _p -γ-PyPyH _p Py
	1306) 5'-W G G T A T A W-3'	I _m I _m H _p PyH _p Py-γ-HpPyH _p Py
	1307) 5'-W G G T A T G W-3'	I _m I _m H _p PyH _p I _m -γ-PyPyH _p Py
	1308) 5'-W G G T A T C W-3'	I _m I _m H _p PyH _p Py-γ-I _m PyH _p Py
	1309) 5'-W G G T A A T W-3'	I _m I _m H _p PyH _p -γ-PyH _p H _p Py
25	1310) 5'-W G G T A A A W-3'	I _m I _m H _p PyPyPy-γ-HpH _p H _p Py
	1311) 5'-W G G T A A G W-3'	I _m I _m H _p PyPyI _m -γ-PyH _p H _p Py
	1312) 5'-W G G T A A C W-3'	I _m I _m H _p PyPyPy-γ-I _m H _p H _p Py
	1313) 5'-W G G T A G T W-3'	I _m I _m H _p PyI _m H _p -γ-PyPyH _p Py
	1314) 5'-W G G T A G A W-3'	I _m I _m H _p PyI _m Py-γ-HpPyH _p Py
30	1315) 5'-W G G T A G G W-3'	I _m I _m H _p PyI _m I _m -γ-PyPyH _p Py
	1316) 5'-W G G T A G C W-3'	I _m I _m H _p PyI _m Py-γ-I _m PyH _p Py
	1317) 5'-W G G T A C T W-3'	I _m I _m H _p PyPyH _p -γ-PyI _m H _p Py
	1318) 5'-W G G T A C A W-3'	I _m I _m H _p PyPyPy-γ-HpI _m H _p Py
	1319) 5'-W G G T A C G W-3'	I _m I _m H _p PyI _m -γ-PyI _m H _p Py
35	1320) 5'-W G G T A C C W-3'	I _m I _m H _p PyPy-γ-I _m I _m H _p Py

TABLE 87: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1321) 5'-W G G T G T T W-3'	I _m I _m H _p I _m H _p H _p -γ-PyPyPyPyPyPy
	1322) 5'-W G G T G T A W-3'	I _m I _m H _p I _m H _p Py-γ-HpPyPyPyPyPy
	1323) 5'-W G G T G T G W-3'	I _m I _m H _p I _m H _p I _m -γ-PyPyPyPyPyPy
	1324) 5'-W G G T G T C W-3'	I _m I _m H _p I _m H _p Py-γ-I _m PyPyPyPy
	1325) 5'-W G G T G A T W-3'	I _m I _m H _p I _m PyH _p -γ-PyH _p PyPyPy
10	1326) 5'-W G G T G A A W-3'	I _m I _m H _p I _m PyPy-γ-HpH _p PyPyPy
	1327) 5'-W G G T G A G W-3'	I _m I _m H _p I _m PyI _m -γ-PyH _p PyPyPy
	1328) 5'-W G G T G A C W-3'	I _m I _m H _p I _m PyPy-γ-I _m H _p PyPyPy
	1329) 5'-W G G T G G T W-3'	I _m I _m H _p I _m I _m H _p -γ-PyPyPyPyPy
	1330) 5'-W G G T G G A W-3'	I _m I _m H _p I _m I _m Py-γ-HpPyPyPy
15	1331) 5'-W G G T G C T W-3'	I _m I _m H _p I _m PyH _p -γ-PyI _m PyPyPy
	1332) 5'-W G G T G C A W-3'	I _m I _m H _p I _m PyPy-γ-HpI _m PyPy
	1333) 5'-W G G T G G G W-3'	I _m I _m H _p I _m I _m I _m -γ-PyPyPyPy
	1334) 5'-W G G T G G C W-3'	I _m I _m H _p I _m I _m Py-γ-I _m PyPyPy
	1335) 5'-W G G T G C G W-3'	I _m I _m H _p I _m PyI _m -γ-PyI _m PyPy
20	1336) 5'-W G G T G C C W-3'	I _m I _m H _p I _m PyPy-γ-I _m I _m PyPy
	1337) 5'-W G G T C T T W-3'	I _m I _m H _p PyH _p H _p -γ-PyPyI _m PyPy
	1338) 5'-W G G T C T A W-3'	I _m I _m H _p PyH _p Py-γ-HpPyI _m PyPy
	1339) 5'-W G G T C T G W-3'	I _m I _m H _p PyH _p I _m -γ-PyPyI _m PyPy
	1340) 5'-W G G T C T C W-3'	I _m I _m H _p PyH _p Py-γ-I _m PyI _m PyPy
25	1341) 5'-W G G T C A T W-3'	I _m I _m H _p PyH _p -γ-PyH _p I _m PyPy
	1342) 5'-W G G T C A A W-3'	I _m I _m H _p PyPyPy-γ-HpH _p I _m PyPy
	1343) 5'-W G G T C A G W-3'	I _m I _m H _p PyPyI _m -γ-PyH _p I _m PyPy
	1344) 5'-W G G T C A C W-3'	I _m I _m H _p PyPyPy-γ-I _m H _p I _m PyPy
	1345) 5'-W G G T C G T W-3'	I _m I _m H _p PyI _m H _p -γ-PyPyI _m PyPy
30	1346) 5'-W G G T C G A W-3'	I _m I _m H _p PyI _m Py-γ-HpPyI _m PyPy
	1347) 5'-W G G T C C T W-3'	I _m I _m H _p PyPyH _p -γ-PyI _m I _m PyPy
	1348) 5'-W G G T C C A W-3'	I _m I _m H _p PyPyPy-γ-HpI _m I _m PyPy
	1349) 5'-W G G T C G G W-3'	I _m I _m H _p PyI _m I _m -γ-PyPyI _m PyPy
	1350) 5'-W G G T C G C W-3'	I _m I _m H _p PyI _m Py-γ-I _m PyI _m PyPy
35	1351) 5'-W G G T C C G W-3'	I _m I _m H _p PyPyI _m -γ-PyI _m I _m PyPy
	1352) 5'-W G G T C C C W-3'	I _m I _m H _p PyPyPy-γ-I _m I _m I _m PyPy

TABLE 88: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1353) 5'-W G G A T T T T W-3'	I _m I _m P _y H _p H _p H _p -γ-P _y P _y P _y H _p P _y P _y
	1354) 5'-W G G A T T T A W-3'	I _m I _m P _y H _p H _p P _y -γ-H _p P _y P _y H _p P _y P _y
	1355) 5'-W G G A T T T G W-3'	I _m I _m P _y H _p H _p I _m -γ-P _y P _y P _y H _p P _y P _y
	1356) 5'-W G G A T T T C W-3'	I _m I _m P _y H _p H _p P _y -γ-I _m P _y P _y H _p P _y P _y
10	1357) 5'-W G G A T A T W-3'	I _m I _m P _y H _p P _y H _p -γ-P _y H _p P _y H _p P _y P _y
	1358) 5'-W G G A T A A W-3'	I _m I _m P _y H _p P _y P _y -γ-H _p H _p P _y H _p P _y P _y
15	1359) 5'-W G G A T A G W-3'	I _m I _m P _y H _p P _y I _m -γ-P _y H _p P _y H _p P _y P _y
	1360) 5'-W G G A T A C W-3'	I _m I _m P _y H _p P _y P _y -γ-I _m H _p P _y H _p P _y P _y
	1361) 5'-W G G A T G T W-3'	I _m I _m P _y H _p I _m H _p -γ-P _y P _y P _y H _p P _y P _y
	1362) 5'-W G G A T G A W-3'	I _m I _m P _y H _p I _m P _y -γ-H _p P _y P _y H _p P _y P _y
	1363) 5'-W G G A T G G W-3'	I _m I _m P _y H _p I _m I _m -γ-P _y P _y P _y H _p P _y P _y
20	1364) 5'-W G G A T G C W-3'	I _m I _m P _y H _p I _m P _y -γ-I _m P _y P _y H _p P _y P _y
	1365) 5'-W G G A T C T W-3'	I _m I _m P _y H _p P _y H _p -γ-P _y I _m P _y H _p P _y P _y
	1366) 5'-W G G A T C A W-3'	I _m I _m P _y H _p P _y P _y -γ-H _p I _m P _y H _p P _y P _y
	1367) 5'-W G G A T C G W-3'	I _m I _m P _y H _p P _y I _m -γ-P _y I _m P _y H _p P _y P _y
	1368) 5'-W G G A T C C W-3'	I _m I _m P _y H _p P _y P _y -γ-I _m I _m P _y H _p P _y P _y
25	1369) 5'-W G G A A T T W-3'	I _m I _m P _y P _y H _p H _p -γ-P _y P _y H _p H _p P _y P _y
	1370) 5'-W G G A A T A W-3'	I _m I _m P _y P _y H _p P _y -γ-H _p P _y H _p H _p P _y P _y
	1371) 5'-W G G A A T G W-3'	I _m I _m P _y P _y H _p I _m -γ-P _y P _y H _p H _p P _y P _y
	1372) 5'-W G G A A T C W-3'	I _m I _m P _y P _y H _p P _y -γ-I _m P _y H _p H _p P _y P _y
	1373) 5'-W G G A A A T W-3'	I _m I _m P _y P _y H _p P _y -γ-P _y H _p H _p H _p P _y P _y
30	1374) 5'-W G G A A A A W-3'	I _m I _m P _y P _y P _y P _y -γ-H _p H _p H _p H _p P _y P _y
	1375) 5'-W G G A A A G W-3'	I _m I _m P _y P _y P _y I _m -γ-P _y H _p H _p H _p P _y P _y
	1376) 5'-W G G A A A C W-3'	I _m I _m P _y P _y P _y P _y -γ-I _m H _p H _p H _p P _y P _y
	1377) 5'-W G G A A A G T W-3'	I _m I _m P _y P _y I _m H _p -γ-P _y P _y H _p H _p P _y P _y
	1378) 5'-W G G A A A G A W-3'	I _m I _m P _y P _y I _m P _y -γ-H _p P _y H _p H _p P _y P _y
35	1379) 5'-W G G A A A G G W-3'	I _m I _m P _y P _y I _m I _m -γ-P _y P _y H _p H _p P _y P _y
	1380) 5'-W G G A A A G C W-3'	I _m I _m P _y P _y I _m P _y -γ-I _m P _y H _p H _p P _y P _y
	1381) 5'-W G G A A C T W-3'	I _m I _m P _y P _y H _p -γ-P _y I _m H _p H _p P _y P _y
	1382) 5'-W G G A A C A W-3'	I _m I _m P _y P _y P _y -γ-H _p I _m H _p H _p P _y P _y
	1383) 5'-W G G A A C G W-3'	I _m I _m P _y P _y I _m -γ-P _y I _m H _p H _p P _y P _y
	1384) 5'-W G G A A C C W-3'	I _m I _m P _y P _y P _y -γ-I _m I _m H _p H _p P _y P _y

TABLE 89: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1385) 5'-W G G A G T T W-3'	ImImPyImHpHp-γ-PyPyPyHpPyPy
	1386) 5'-W G G A G T A W-3'	ImImPyImHpPy-γ-HpPyPyHpPyPy
	1387) 5'-W G G A G T G W-3'	ImImPyImHpIm-γ-PyPyPyHpPyPy
	1388) 5'-W G G A G T C W-3'	ImImPyImHpPy-γ-ImPyPyHpPyPy
	1389) 5'-W G G A G A T W-3'	ImImPyImPyHp-γ-PyHpPyHpPyPy
10	1390) 5'-W G G A G A A W-3'	ImImPyImPyPy-γ-HpHpPyHpPyPy
	1391) 5'-W G G A G A G W-3'	ImImPyImPyIm-γ-PyHpPyHpPyPy
	1392) 5'-W G G A G A C W-3'	ImImPyImPyPy-γ-ImHpPyHpPyPy
	1393) 5'-W G G A G G T W-3'	ImImPyImImHp-γ-PyPyPyHpPyPy
	1394) 5'-W G G A G G A W-3'	ImImPyImImPy-γ-HpPyPyHpPyPy
15	1395) 5'-W G G A G C T W-3'	ImImPyImPyHp-γ-PyImPyHpPyPy
	1396) 5'-W G G A G C A W-3'	ImImPyImPyPy-γ-HpImPyHpPyPy
	1397) 5'-W G G A G G G W-3'	ImImPyImImIm-γ-PyPyPyHpPyPy
	1398) 5'-W G G A G G C W-3'	ImImPyImImPy-γ-ImPyPyHpPyPy
	1399) 5'-W G G A G C G W-3'	ImImPyImPyIm-γ-PyImPyHpPyPy
20	1400) 5'-W G G A G C C W-3'	ImImPyImPyPy-γ-ImImPyHpPyPy
	1401) 5'-W G G A C T T W-3'	ImImPyPyHpHp-γ-PyPyImHpPyPy
	1402) 5'-W G G A C T A W-3'	ImImPyPyHpPy-γ-HpPyImHpPyPy
	1403) 5'-W G G A C T G W-3'	ImImPyPyHpIm-γ-PyPyImHpPyPy
	1404) 5'-W G G A C T C W-3'	ImImPyPyHpPy-γ-ImPyImHpPyPy
25	1405) 5'-W G G A C A T W-3'	ImImPyPyHp-γ-PyHpiMpPyPy
	1406) 5'-W G G A C A A W-3'	ImImPyPyPyPy-γ-HpHpiMpPyPy
	1407) 5'-W G G A C A G W-3'	ImImPyPyPyIm-γ-PyHpiMpPyPy
	1408) 5'-W G G A C A C W-3'	ImImPyPyPyPy-γ-ImHpiMpPyPy
	1409) 5'-W G G A C G T W-3'	ImImPyPyImHp-γ-PyPyImHpPyPy
30	1410) 5'-W G G A C G A W-3'	ImImPyPyImPy-γ-HpPyImHpPyPy
	1411) 5'-W G G A C C T W-3'	ImImPyPyPyHp-γ-PyImImHpPyPy
	1412) 5'-W G G A C C A W-3'	ImImPyPyPyPy-γ-HpImImHpPyPy
	1413) 5'-W G G A C C G W-3'	ImImPyPyImIm-γ-PyPyImHpPyPy
	1414) 5'-W G G A C G C W-3'	ImImPyPyImPy-γ-ImPyImHpPyPy
35	1415) 5'-W G G A C C G W-3'	ImImPyPyPyIm-γ-PyImImHpPyPy
	1416) 5'-W G G A C C C W-3'	ImImPyPyPyPy-γ-ImImImHpPyPy

TABLE 90: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGCWNW-3'

	DNA sequence	aromatic amino acid sequence
	1417) 5'-W G G C T T T W-3'	I _m I _m P _y H _p H _p H _p -γ-P _y P _y P _y I _m P _y P _y
5	1418) 5'-W G G C T T A W-3'	I _m I _m P _y H _p H _p P _y -γ-H _p P _y P _y I _m P _y P _y
	1419) 5'-W G G C T T G W-3'	I _m I _m P _y H _p H _p I _m -γ-P _y P _y P _y I _m P _y P _y
	1420) 5'-W G G C T T C W-3'	I _m I _m P _y H _p H _p P _y -γ-I _m P _y P _y I _m P _y P _y
	1421) 5'-W G G C T A T W-3'	I _m I _m P _y H _p P _y H _p -γ-P _y H _p P _y I _m P _y P _y
	1422) 5'-W G G C T A A W-3'	I _m I _m P _y H _p P _y P _y -γ-H _p H _p P _y I _m P _y P _y
10	1423) 5'-W G G C T A G W-3'	I _m I _m P _y H _p P _y I _m -γ-P _y H _p P _y I _m P _y P _y
	1424) 5'-W G G C T A C W-3'	I _m I _m P _y H _p P _y P _y -γ-I _m H _p P _y I _m P _y P _y
	1425) 5'-W G G C T G T W-3'	I _m I _m P _y H _p I _m H _p -γ-P _y P _y P _y I _m P _y P _y
	1426) 5'-W G G C T G A W-3'	I _m I _m P _y H _p I _m P _y -γ-H _p P _y P _y I _m P _y P _y
	1427) 5'-W G G C T G G W-3'	I _m I _m P _y H _p I _m I _m -γ-P _y P _y P _y I _m P _y P _y
15	1428) 5'-W G G C T G C W-3'	I _m I _m P _y H _p I _m P _y -γ-I _m P _y P _y I _m P _y P _y
	1429) 5'-W G G C T C T W-3'	I _m I _m P _y H _p P _y H _p -γ-P _y I _m P _y I _m P _y P _y
	1430) 5'-W G G C T C A W-3'	I _m I _m P _y H _p P _y P _y -γ-H _p I _m P _y I _m P _y P _y
	1431) 5'-W G G C T C G W-3'	I _m I _m P _y H _p P _y I _m -γ-P _y I _m P _y I _m P _y P _y
	1432) 5'-W G G C T C C W-3'	I _m I _m P _y H _p P _y P _y -γ-I _m I _m P _y I _m P _y P _y
20	1433) 5'-W G G C A T T W-3'	I _m I _m P _y P _y H _p H _p -γ-P _y P _y H _p I _m P _y P _y
	1434) 5'-W G G C A T A W-3'	I _m I _m P _y P _y H _p P _y -γ-H _p P _y H _p I _m P _y P _y
	1435) 5'-W G G C A T G W-3'	I _m I _m P _y P _y H _p I _m -γ-P _y P _y H _p I _m P _y P _y
	1436) 5'-W G G C A T C W-3'	I _m I _m P _y P _y H _p P _y -γ-I _m P _y H _p I _m P _y P _y
	1437) 5'-W G G C A A T W-3'	I _m I _m P _y P _y H _p -γ-P _y H _p H _p I _m P _y P _y
25	1438) 5'-W G G C A A A W-3'	I _m I _m P _y P _y P _y -γ-H _p H _p H _p I _m P _y P _y
	1439) 5'-W G G C A A G W-3'	I _m I _m P _y P _y P _y I _m -γ-P _y H _p H _p I _m P _y P _y
	1440) 5'-W G G C A A C W-3'	I _m I _m P _y P _y P _y P _y -γ-I _m H _p H _p I _m P _y P _y
	1441) 5'-W G G C A G T W-3'	I _m I _m P _y P _y I _m H _p -γ-P _y P _y H _p I _m P _y P _y
	1442) 5'-W G G C A G A W-3'	I _m I _m P _y P _y I _m P _y -γ-H _p P _y H _p I _m P _y P _y
30	1443) 5'-W G G C A G G W-3'	I _m I _m P _y P _y I _m I _m -γ-P _y P _y H _p I _m P _y P _y
	1444) 5'-W G G C A G C W-3'	I _m I _m P _y P _y I _m P _y -γ-I _m P _y H _p I _m P _y P _y
	1445) 5'-W G G C A C T W-3'	I _m I _m P _y P _y H _p -γ-P _y I _m H _p I _m P _y P _y
	1446) 5'-W G G C A C A W-3'	I _m I _m P _y P _y P _y P _y -γ-H _p I _m H _p I _m P _y P _y
	1447) 5'-W G G C A C G W-3'	I _m I _m P _y P _y P _y I _m -γ-P _y I _m H _p I _m P _y P _y
35	1448) 5'-W G G C A C C W-3'	I _m I _m P _y P _y P _y P _y -γ-I _m I _m H _p I _m P _y P _y

TABLE 91: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
	1449) 5'-W G G C G T T W-3'	ImImPyImHpH _p -γ-PyPyPyImPyPy
5	1450) 5'-W G G C G T A W-3'	ImImPyImHpPy-γ-HpPyPyImPyPy
	1451) 5'-W G G C G T G W-3'	ImImPyImHpIm-γ-PyPyPyImPyPy
	1452) 5'-W G G C G T C W-3'	ImImPyImHpPy-γ-ImPyPyImPyPy
	1453) 5'-W G G C G A T W-3'	ImImPyImPyH _p -γ-PyH _p PyImPyPy
10	1454) 5'-W G G C G A A W-3'	ImImPyImPyPy-γ-HpH _p PyImPyPy
	1455) 5'-W G G C G A G W-3'	ImImPyImPyIm-γ-PyH _p PyImPyPy
	1456) 5'-W G G C G A C W-3'	ImImPyImPyPy-γ-ImH _p PyImPyPy
	1457) 5'-W G G C G G T W-3'	ImImPyImImH _p -γ-PyPyPyImPyPy
	1458) 5'-W G G C G G A W-3'	ImImPyImImPy-γ-HpPyPyImPyPy
15	1459) 5'-W G G C G C T W-3'	ImImPyImPyH _p -γ-PyImPyImPyPy
	1460) 5'-W G G C G C A W-3'	ImImPyImPyPy-γ-HpImPyImPyPy
	1461) 5'-W G G C C T T W-3'	ImImPyPyH _p H _p -γ-PyPyImImPyPy
	1462) 5'-W G G C C T A W-3'	ImImPyPyH _p Py-γ-HpPyImImPyPy
	1463) 5'-W G G C C T G W-3'	ImImPyPyH _p Im-γ-PyPyImImPyPy
	1464) 5'-W G G C C T C W-3'	ImImPyPyH _p Py-γ-ImPyImImPyPy
20	1465) 5'-W G G C C A T W-3'	ImImPyPyPyH _p -γ-PyH _p ImImPyPy
	1466) 5'-W G G C C A A W-3'	ImImPyPyPyPy-γ-HpH _p ImImPyPy
	1467) 5'-W G G C C A G W-3'	ImImPyPyPyIm-γ-PyH _p ImImPyPy
	1468) 5'-W G G C C A C W-3'	ImImPyPyPyPy-γ-ImH _p ImImPyPy
	1469) 5'-W G G C C G T W-3'	ImImPyPyImH _p -γ-PyPyImImPyPy
25	1470) 5'-W G G C C G A W-3'	ImImPyPyImPy-γ-HpPyImImPyPy
	1471) 5'-W G G C C C T W-3'	ImImPyPyPyH _p -γ-PyImImImPyPy
	1472) 5'-W G G C C C A W-3'	ImImPyPyPyPy-γ-HpImImImPyPy
	G57) 5'-W G G C G G G W-3'	ImImPyImImIm-γ-PyPyPyImPyPy
	G58) 5'-W G G C G G C W-3'	ImImPyImImPy-γ-ImPyPyImPyPy
30	G59) 5'-W G G C G C G W-3'	ImImPyImPyIm-γ-PyImPyImPyPy
	G60) 5'-W G G C G C C W-3'	ImImPyImPyPy-γ-ImImPyImPyPy
	G61) 5'-W G G C C G G W-3'	ImImPyPyImIm-γ-PyPyImImPyPy
	G62) 5'-W G G C C G C W-3'	ImImPyPyImPy-γ-ImPyImImPyPy
	G63) 5'-W G G C C C G W-3'	ImImPyPyPyIm-γ-PyImImImPyPy
35	G64) 5'-W G G C C C C W-3'	ImImPyPyPyPy-γ-ImImImImPyPy

TABLE 92: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1473) 5'-W G C G T T T W-3'	ImPyImHpHpHp-γ-PyPyPyPyImPy
5	1474) 5'-W G C G T T A W-3'	ImPyImHpHpPy-γ-HpPyPyPyImPy
	1475) 5'-W G C G T T G W-3'	ImPyImHpHpIm-γ-PyPyPyPyImPy
	1476) 5'-W G C G T T C W-3'	ImPyImHpHpPy-γ-ImPyPyPyImPy
	1477) 5'-W G C G T A T W-3'	ImPyImHpPyHp-γ-PyHppPyPyImPy
	1478) 5'-W G C G T A A W-3'	ImPyImHpPyPy-γ-HpHppPyPyImPy
10	1479) 5'-W G C G T A G W-3'	ImPyImHpPyIm-γ-PyHppPyPyImPy
	1480) 5'-W G C G T A C W-3'	ImPyImHpPyPy-γ-ImHppPyPyImPy
	1481) 5'-W G C G T G T W-3'	ImPyImHpImHp-γ-PyPyPyPyImPy
	1482) 5'-W G C G T G A W-3'	ImPyImHpImPy-γ-HpPyPyPyImPy
	1483) 5'-W G C G T G G W-3'	ImPyImHpImIm-γ-PyPyPyPyImPy
15	1484) 5'-W G C G T G C W-3'	ImPyImHpImPy-γ-ImPyPyPyImPy
	1485) 5'-W G C G T C T W-3'	ImPyImHpPyHp-γ-PyImPyPyImPy
	1486) 5'-W G C G T C A W-3'	ImPyImHpPyPy-γ-HpImPyPyImPy
	1487) 5'-W G C G T C G W-3'	ImPyImHpPyIm-γ-PyImPyPyImPy
	1488) 5'-W G C G T C C W-3'	ImPyImHpPyPy-γ-ImImPyPyImPy
20	1489) 5'-W G C G A T T W-3'	ImPyImPyHpHp-γ-PyPyHppPyImPy
	1490) 5'-W G C G A T A W-3'	ImPyImPyHpPy-γ-HpPyHppPyImPy
	1491) 5'-W G C G A T G W-3'	ImPyImPyHpIm-γ-PyPyHppPyImPy
	1492) 5'-W G C G A T C W-3'	ImPyImPyHpPy-γ-ImPyHppPyImPy
	1493) 5'-W G C G A A T W-3'	ImPyImPyHp-γ-PyHppHppPyImPy
25	1494) 5'-W G C G A A A W-3'	ImPyImPyPyPy-γ-HpHppHppPyImPy
	1495) 5'-W G C G A A G W-3'	ImPyImPyPyIm-γ-PyHppHppPyImPy
	1496) 5'-W G C G A A C W-3'	ImPyImPyPyPy-γ-ImHpHppPyImPy
	1497) 5'-W G C G A G T W-3'	ImPyImPyImHp-γ-PyPyHppPyImPy
	1498) 5'-W G C G A G A W-3'	ImPyImPyImPy-γ-HpPyHppPyImPy
30	1499) 5'-W G C G A G G W-3'	ImPyImPyImIm-γ-PyPyHppPyImPy
	1500) 5'-W G C G A G C W-3'	ImPyImPyImPy-γ-ImPyHppPyImPy
	1501) 5'-W G C G A C T W-3'	ImPyImPyPyHp-γ-PyImHpPyImPy
	1502) 5'-W G C G A C A W-3'	ImPyImPyPyPy-γ-HpImHppPyImPy
	1503) 5'-W G C G A C G W-3'	ImPyImPyPyIm-γ-PyImHppPyImPy
35	1504) 5'-W G C G A C C W-3'	ImPyImPyPyPy-γ-ImImHppPyImPy

TABLE 93: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
	1505) 5'-W G C G G T T W-3'	ImPyImImHpHp-γ-PyPyPyPyImPy
5	1506) 5'-W G C G G T A W-3'	ImPyImImHpPy-γ-HpPyPyPyImPy
	1507) 5'-W G C G G T G W-3'	ImPyImImHpIm-γ-PyPyPyPyImPy
	1508) 5'-W G C G G T C W-3'	ImPyImImHpPy-γ-ImPyPyPyImPy
	1509) 5'-W G C G G A T W-3'	ImPyImImPyHp-γ-PyHpPyPyImPy
10	1510) 5'-W G C G G A A W-3'	ImPyImImPyPy-γ-HpHpPyPyImPy
	1511) 5'-W G C G G A G W-3'	ImPyImImPyIm-γ-PyHpPyPyImPy
	1512) 5'-W G C G G A C W-3'	ImPyImImPyPy-γ-ImHpPyPyImPy
	1513) 5'-W G C G G G T W-3'	ImPyImImImHp-γ-PyPyPyPyImPy
	1514) 5'-W G C G G G A W-3'	ImPyImImImPy-γ-HpPyPyPyImPy
15	1515) 5'-W G C G G C T W-3'	ImPyImImPyHp-γ-PyImPyPyImPy
	1516) 5'-W G C G G C A W-3'	ImPyImImPyPy-γ-HpImPyPyImPy
	1517) 5'-W G C G C T T W-3'	ImPyImPyHpHp-γ-PyPyImPyImPy
	1518) 5'-W G C G C T A W-3'	ImPyImPyHpPy-γ-HpPyImPyImPy
	1519) 5'-W G C G C T G W-3'	ImPyImPyHpIm-γ-PyPyImPyImPy
20	1520) 5'-W G C G C T C W-3'	ImPyImPyHpPy-γ-ImPyImPyImPy
	1521) 5'-W G C G C A T W-3'	ImPyImPyPyHp-γ-PyHpImPyImPy
	1522) 5'-W G C G C A A W-3'	ImPyImPyPyPy-γ-HpHpImPyImPy
	1523) 5'-W G C G C A G W-3'	ImPyImPyPyIm-γ-PyHpImPyImPy
	1524) 5'-W G C G C A C W-3'	ImPyImPyPyPy-γ-ImHpImPyImPy
25	1525) 5'-W G C G C G T W-3'	ImPyImPyImHp-γ-PyPyImPyImPy
	1526) 5'-W G C G C G A W-3'	ImPyImPyImPy-γ-HpPyImPyImPy
	1527) 5'-W G C G C C T W-3'	ImPyImPyPyHp-γ-PyImImPyImPy
	1528) 5'-W G C G C C A W-3'	ImPyImPyPyPy-γ-HpImImPyImPy
	G65) 5'-W G C G G G G W-3'	ImPyImImImIm-γ-PyPyPyPyImPy
	G66) 5'-W G C G G G C W-3'	ImPyImImImPy-γ-ImPyPyPyImPy
30	G67) 5'-W G C G G C G W-3'	ImPyImImPyIm-γ-PyImPyPyImPy
	G68) 5'-W G C G G C C W-3'	ImPyImImPyPy-γ-ImImPyPyImPy
	G69) 5'-W G C G C G G W-3'	ImPyImPyImIm-γ-PyPyImPyImPy
	G70) 5'-W G C G C G C W-3'	ImPyImPyImPy-γ-ImPyImPyImPy
	G71) 5'-W G C G C C G W-3'	ImPyImPyPyIm-γ-PyImImPyImPy
35	G72) 5'-W G C G C C C W-3'	ImPyImPyPyPy-γ-ImImImPyImPy

TABLE 94: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCTWNW-3'

	DNA sequence	aromatic amino acid sequence
	1529) 5'-W G C T T T T W-3'	ImPyH _p H _p H _p H _p -γ-PyPyPyPyImPy
5	1530) 5'-W G C T T T A W-3'	ImPyH _p H _p H _p Py-γ-HpPyPyPyImPy
	1531) 5'-W G C T T T G W-3'	ImPyH _p H _p H _p Im-γ-PyPyPyPyImPy
	1532) 5'-W G C T T T C W-3'	ImPyH _p H _p H _p Py-γ-ImPyPyPyImPy
	1533) 5'-W G C T T A T W-3'	ImPyH _p H _p PyH _p -γ-PyH _p PyPyImPy
	1534) 5'-W G C T T A A W-3'	ImPyH _p H _p PyPy-γ-HpH _p PyPyImPy
10	1535) 5'-W G C T T A G W-3'	ImPyH _p H _p PyIm-γ-PyH _p PyPyImPy
	1536) 5'-W G C T T A C W-3'	ImPyH _p H _p PyPy-γ-ImH _p PyPyImPy
	1537) 5'-W G C T T G T W-3'	ImPyH _p H _p ImH _p -γ-PyPyPyPyImPy
	1538) 5'-W G C T T G A W-3'	ImPyH _p H _p ImPy-γ-HpPyPyPyImPy
	1539) 5'-W G C T T G G W-3'	ImPyH _p H _p ImIm-γ-PyPyPyPyImPy
15	1540) 5'-W G C T T G C W-3'	ImPyH _p H _p ImPy-γ-ImPyPyPyImPy
	1541) 5'-W G C T T C T W-3'	ImPyH _p H _p PyH _p -γ-PyImPyPyImPy
	1542) 5'-W G C T T C A W-3'	ImPyH _p H _p PyPy-γ-HpImPyPyImPy
	1543) 5'-W G C T T C G W-3'	ImPyH _p H _p PyIm-γ-PyImPyPyImPy
	1544) 5'-W G C T T C C W-3'	ImPyH _p H _p PyPy-γ-ImImPyPyImPy
20	1545) 5'-W G C T A T T W-3'	ImPyH _p PyH _p H _p -γ-PyPyH _p PyImPy
	1546) 5'-W G C T A T A W-3'	ImPyH _p PyH _p Py-γ-HpPyH _p PyImPy
	1547) 5'-W G C T A T G W-3'	ImPyH _p PyH _p Im-γ-PyPyH _p PyImPy
	1548) 5'-W G C T A T C W-3'	ImPyH _p PyH _p Py-γ-ImPyH _p PyImPy
	1549) 5'-W G C T A A T W-3'	ImPyH _p PyH _p Py-γ-PyH _p H _p PyImPy
25	1550) 5'-W G C T A A A W-3'	ImPyH _p PyPyPy-γ-HpH _p H _p PyImPy
	1551) 5'-W G C T A A G W-3'	ImPyH _p PyPyIm-γ-PyH _p H _p PyImPy
	1552) 5'-W G C T A A C W-3'	ImPyH _p PyPyPy-γ-ImH _p H _p PyImPy
	1553) 5'-W G C T A G T W-3'	ImPyH _p PyImH _p -γ-PyPyH _p PyImPy
	1554) 5'-W G C T A G A W-3'	ImPyH _p PyImPy-γ-HpPyH _p PyImPy
30	1555) 5'-W G C T A G G W-3'	ImPyH _p PyImIm-γ-PyPyH _p PyImPy
	1556) 5'-W G C T A G C W-3'	ImPyH _p PyImPy-γ-ImPyH _p PyImPy
	1557) 5'-W G C T A C T W-3'	ImPyH _p PyPyH _p -γ-PyImH _p PyImPy
	1558) 5'-W G C T A C A W-3'	ImPyH _p PyPyPy-γ-HpImH _p PyImPy
	1559) 5'-W G C T A C G W-3'	ImPyH _p PyPyIm-γ-PyImH _p PyImPy
35	1560) 5'-W G C T A C C W-3'	ImPyH _p PyPyPy-γ-ImImH _p PyImPy

TABLE 95: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1561) 5'-W G C T G T T W-3'	ImPyHpImHpH γ -PyPyPyPyImPy
	1562) 5'-W G C T G T A W-3'	ImPyHpImHpPy γ -H β PyPyPyImPy
	1563) 5'-W G C T G T G W-3'	ImPyHpImHpIm γ -PyPyPyPyImPy
	1564) 5'-W G C T G T C W-3'	ImPyHpImHpPy γ -ImPyPyPyImPy
	1565) 5'-W G C T G A T W-3'	ImPyHpImPyH γ -PyH β PyPyImPy
10	1566) 5'-W G C T G A A W-3'	ImPyHpImPyPy γ -H β H β PyPyImPy
	1567) 5'-W G C T G A G W-3'	ImPyHpImPyIm γ -PyH β PyPyImPy
	1568) 5'-W G C T G A C W-3'	ImPyHpImPyPy γ -ImH β PyPyImPy
	1569) 5'-W G C T G G T W-3'	ImPyHpImImH γ -PyPyPyPyImPy
	1570) 5'-W G C T G G A W-3'	ImPyHpImImPy γ -H β PyPyPyImPy
15	1571) 5'-W G C T G C T W-3'	ImPyHpImPyH γ -PyImPyPyImPy
	1572) 5'-W G C T G C A W-3'	ImPyHpImPyPy γ -H β ImPyPyImPy
	1573) 5'-W G C T G G G W-3'	ImPyHpImImIm γ -PyPyPyPyImPy
	1574) 5'-W G C T G G C W-3'	ImPyHpImImPy γ -ImPyPyPyImPy
	1575) 5'-W G C T G C G W-3'	ImPyHpImPyIm γ -PyImPyPyImPy
20	1576) 5'-W G C T G C C W-3'	ImPyHpImPyPy γ -ImImPyPyImPy
	1577) 5'-W G C T C T T W-3'	ImPyHpPyH β P γ -PyPyImPyImPy
	1578) 5'-W G C T C T A W-3'	ImPyHpPyH β P γ -H β PyImPyImPy
	1579) 5'-W G C T C T G W-3'	ImPyHpPyH β Im γ -PyPyImPyImPy
	1580) 5'-W G C T C T C W-3'	ImPyHpPyH β P γ -ImPyImPyImPy
25	1581) 5'-W G C T C A T W-3'	ImPyHpPyH β -PyH β ImPyImPy
	1582) 5'-W G C T C A A W-3'	ImPyHpPyPyPy γ -H β H β ImPyImPy
	1583) 5'-W G C T C A G W-3'	ImPyHpPyPyIm γ -PyH β ImPyImPy
	1584) 5'-W G C T C A C W-3'	ImPyHpPyPyPy γ -ImH β ImPyImPy
	1585) 5'-W G C T C G T W-3'	ImPyHpPyImH γ -PyPyImPyImPy
30	1586) 5'-W G C T C G A W-3'	ImPyHpPyImPy γ -H β PyImPyImPy
	1587) 5'-W G C T C C T W-3'	ImPyHpPyPyH γ -PyImImPyImPy
	1588) 5'-W G C T C C A W-3'	ImPyHpPyPyPy γ -H β ImImPyImPy
	1589) 5'-W G C T C G G W-3'	ImPyHpPyImIm γ -PyPyImPyImPy
	1590) 5'-W G C T C G C W-3'	ImPyHpPyImPy γ -ImPyImPyImPy
35	1591) 5'-W G C T C C G W-3'	ImPyHpPyIm γ -PyImImPyImPy
	1592) 5'-W G C T C C C W-3'	ImPyHpPyPyPy γ -ImImImPyImPy

TABLE 96: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1593) 5'-W G C A T T T W-3'	ImPyPyHpHpHp-γ-PyPyPyHpImPy
	1594) 5'-W G C A T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyHpImPy
	1595) 5'-W G C A T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyHpImPy
	1596) 5'-W G C A T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyHpImPy
	1597) 5'-W G C A T A T W-3'	ImPyPyHpPyHp-γ-PyHpPyHpImPy
10	1598) 5'-W G C A T A A W-3'	ImPyPyHpPyPy-γ-HpHpPyHpImPy
	1599) 5'-W G C A T A G W-3'	ImPyPyHpPyIm-γ-PyHpPyHpImPy
	1600) 5'-W G C A T A C W-3'	ImPyPyHpPyPy-γ-ImHpPyHpImPy
	1601) 5'-W G C A T G T W-3'	ImPyPyHpImHp-γ-PyPyPyHpImPy
	1602) 5'-W G C A T G A W-3'	ImPyPyHpImPy-γ-HpPyPyHpImPy
15	1603) 5'-W G C A T G G W-3'	ImPyPyHpImIm-γ-PyPyPyHpImPy
	1604) 5'-W G C A T G C W-3'	ImPyPyHpImPy-γ-ImPyPyHpImPy
	1605) 5'-W G C A T C T W-3'	ImPyPyHpPyHp-γ-PyImPyHpImPy
	1606) 5'-W G C A T C A W-3'	ImPyPyHpPyPy-γ-HpImPyHpImPy
	1607) 5'-W G C A T C G W-3'	ImPyPyHpPyIm-γ-PyImPyHpImPy
	1608) 5'-W G C A T C C W-3'	ImPyPyHpPyPy-γ-ImImPyHpImPy
20	1609) 5'-W G C A A T T W-3'	ImPyPyPyHpHp-γ-PyPyHpHpImPy
	1610) 5'-W G C A A T A W-3'	ImPyPyPyHpPy-γ-HpPyHpHpImPy
	1611) 5'-W G C A A T G W-3'	ImPyPyPyHpIm-γ-PyPyHpHpImPy
	1612) 5'-W G C A A T C W-3'	ImPyPyPyHpPy-γ-ImPyHpHpImPy
	1613) 5'-W G C A A A T W-3'	ImPyPyPyPyHp-γ-PyHpHpHpImPy
25	1614) 5'-W G C A A A A W-3'	ImPyPyPyPyPy-γ-HpHpHpHpImPy
	1615) 5'-W G C A A A G W-3'	ImPyPyPyPyIm-γ-PyHpHpHpImPy
	1616) 5'-W G C A A A C W-3'	ImPyPyPyPyPyPy-γ-ImHpHpHpImPy
	1617) 5'-W G C A A A G T W-3'	ImPyPyPyImHp-γ-PyPyHpHpImPy
	1618) 5'-W G C A A A G A W-3'	ImPyPyPyImPy-γ-HpPyHpHpImPy
30	1619) 5'-W G C A A A G G W-3'	ImPyPyPyImIm-γ-PyPyHpHpImPy
	1620) 5'-W G C A A A G C W-3'	ImPyPyPyImPy-γ-ImPyHpHpImPy
	1621) 5'-W G C A A A C T W-3'	ImPyPyPyPyHp-γ-PyImHpHpImPy
	1622) 5'-W G C A A A C A W-3'	ImPyPyPyPyPy-γ-HpImHpHpImPy
	1623) 5'-W G C A A A C G W-3'	ImPyPyPyPyIm-γ-PyImHpHpImPy
35	1624) 5'-W G C A A A C C W-3'	ImPyPyPyPyPy-γ-ImImHpHpImPy

TABLE 97: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1625) 5'-W G C A G T T W-3'	ImPyPyImHpHp-γ-PyPyPyHpImPy
	1626) 5'-W G C A G T A W-3'	ImPyPyImHpPy-γ-HpPyPyHpImPy
	1627) 5'-W G C A G T G W-3'	ImPyPyImHpIm-γ-PyPyPyHpImPy
	1628) 5'-W G C A G T C W-3'	ImPyPyImHpPy-γ-ImPyPyHpImPy
	1629) 5'-W G C A G A T W-3'	ImPyPyImPyHp-γ-PyHpPyHpImPy
10	1630) 5'-W G C A G A A W-3'	ImPyPyImPyPy-γ-HpHpPyHpImPy
	1631) 5'-W G C A G A G W-3'	ImPyPyImPyIm-γ-PyHpPyHpImPy
	1632) 5'-W G C A G A C W-3'	ImPyPyImPyPy-γ-ImHpPyHpImPy
	1633) 5'-W G C A G G T W-3'	ImPyPyImImHp-γ-PyPyPyHpImPy
	1634) 5'-W G C A G G A W-3'	ImPyPyImImPy-γ-HpPyPyHpImPy
15	1635) 5'-W G C A G C T W-3'	ImPyPyImPyHp-γ-PyImPyHpImPy
	1636) 5'-W G C A G C A W-3'	ImPyPyImPyPy-γ-HpImPyHpImPy
	1637) 5'-W G C A G G G W-3'	ImPyPyImImIm-γ-PyPyPyHpImPy
	1638) 5'-W G C A G G C W-3'	ImPyPyImImPy-γ-ImPyPyHpImPy
	1639) 5'-W G C A G C G W-3'	ImPyPyImPyIm-γ-PyImPyHpImPy
20	1640) 5'-W G C A G C C W-3'	ImPyPyImPyPy-γ-ImImPyHpImPy
	1641) 5'-W G C A C T T W-3'	ImPyPyPyHpHp-γ-PyPyImHpImPy
	1642) 5'-W G C A C T A W-3'	ImPyPyPyHpPy-γ-HpPyImHpImPy
	1643) 5'-W G C A C T G W-3'	ImPyPyPyHpIm-γ-PyPyImHpImPy
	1644) 5'-W G C A C T C W-3'	ImPyPyPyHpPy-γ-ImPyImHpImPy
25	1645) 5'-W G C A C A T W-3'	ImPyPyPyHp-γ-PyHpImHpImPy
	1646) 5'-W G C A C A A W-3'	ImPyPyPyPyPy-γ-HpHpImHpImPy
	1647) 5'-W G C A C A G W-3'	ImPyPyPyPyIm-γ-PyHpImHpImPy
	1648) 5'-W G C A C A C W-3'	ImPyPyPyPyPy-γ-ImHpImHpImPy
	1649) 5'-W G C A C G T W-3'	ImPyPyPyImHp-γ-PyPyImHpImPy
30	1650) 5'-W G C A C G A W-3'	ImPyPyPyImPy-γ-HpPyImHpImPy
	1651) 5'-W G C A C C T W-3'	ImPyPyPyPyHp-γ-PyImImHpImPy
	1652) 5'-W G C A C C A W-3'	ImPyPyPyPyPy-γ-HpImImHpImPy
	1653) 5'-W G C A C G G W-3'	ImPyPyPyImIm-γ-PyPyImHpImPy
	1654) 5'-W G C A C G C W-3'	ImPyPyPyImPy-γ-ImPyImHpImPy
35	1655) 5'-W G C A C C C G W-3'	ImPyPyPyPyIm-γ-PyImImHpImPy
	1656) 5'-W G C A C C C C W-3'	ImPyPyPyPyPy-γ-ImImImHpImPy

TABLE 98: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1657) 5'-W G C C T T T W-3'	ImPyPyHpHpPy-γ-PyPyPyImImPy
	1658) 5'-W G C C T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyImImPy
	1659) 5'-W G C C T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyImImPy
	1660) 5'-W G C C T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyImImPy
	1661) 5'-W G C C T A T W-3'	ImPyPyHpPyHp-γ-PyHpPyImImPy
	1662) 5'-W G C C T A A W-3'	ImPyPyHpPyPy-γ-HpHpPyImImPy
10	1663) 5'-W G C C T A G W-3'	ImPyPyHpPyIm-γ-PyHpPyImImPy
	1664) 5'-W G C C T A C W-3'	ImPyPyHpPyPy-γ-ImHpPyImImPy
	1665) 5'-W G C C T G T W-3'	ImPyPyHpImHp-γ-PyPyPyImImPy
	1666) 5'-W G C C T G A W-3'	ImPyPyHpImPy-γ-HpPyPyImImPy
	1667) 5'-W G C C T G G W-3'	ImPyPyHpImIm-γ-PyPyPyImImPy
15	1668) 5'-W G C C T G C W-3'	ImPyPyHpImPy-γ-ImPyPyImImPy
	1669) 5'-W G C C T C T W-3'	ImPyPyHpPyHp-γ-PyImPyImImPy
	1670) 5'-W G C C T C A W-3'	ImPyPyHpPyPy-γ-HpImPyImImPy
	1671) 5'-W G C C T C G W-3'	ImPyPyHpPyIm-γ-PyImPyImImPy
	1672) 5'-W G C C T C C W-3'	ImPyPyHpPyPy-γ-ImImPyImImPy
20	1673) 5'-W G C C A T T W-3'	ImPyPyPyHpHp-γ-PyPyHpImImPy
	1674) 5'-W G C C A T A W-3'	ImPyPyPyHpPy-γ-HpPyHpImImPy
	1675) 5'-W G C C A T G W-3'	ImPyPyPyHpIm-γ-PyPyHpImImPy
	1676) 5'-W G C C A T C W-3'	ImPyPyPyHpPy-γ-ImPyHpImImPy
	1677) 5'-W G C C A A T W-3'	ImPyPyPyPyHp-γ-PyHpHpImImPy
25	1678) 5'-W G C C A A A W-3'	ImPyPyPyPyPy-γ-HpHpHpImImPy
	1679) 5'-W G C C A A G W-3'	ImPyPyPyPyPyIm-γ-PyHpHpImImPy
	1680) 5'-W G C C A A C W-3'	ImPyPyPyPyPy-γ-ImHpHpImImPy
	1681) 5'-W G C C A G T W-3'	ImPyPyPyImHp-γ-PyPyHpImImPy
	1682) 5'-W G C C A G A W-3'	ImPyPyPyImPy-γ-HpPyHpImImPy
30	1683) 5'-W G C C A G G W-3'	ImPyPyPyImIm-γ-PyPyHpImImPy
	1684) 5'-W G C C A G C W-3'	ImPyPyPyImPy-γ-ImPyHpImImPy
	1685) 5'-W G C C A C T W-3'	ImPyPyPyPyHp-γ-PyImHpImImPy
	1686) 5'-W G C C A C A W-3'	ImPyPyPyPyPy-γ-HpImHpImImPy
	1687) 5'-W G C C A C G W-3'	ImPyPyPyPyIm-γ-PyImHpImImPy
35	1688) 5'-W G C C A C C W-3'	ImPyPyPyPyPy-γ-ImImHpImImPy

TABLE 99: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGCCSNW-3'

	DNA sequence	aromatic amino acid sequence
	1689) 5'-W G C C C G T T W-3'	ImPyPyImHpHp-γ-PyPyPyImImPy
5	1690) 5'-W G C C C G T A W-3'	ImPyPyImHpPy-γ-HpPyPyImImPy
	1691) 5'-W G C C C G T G W-3'	ImPyPyImHpIm-γ-PyPyPyImImPy
	1692) 5'-W G C C C G T C W-3'	ImPyPyImHpPy-γ-ImPyPyImImPy
	1693) 5'-W G C C C G A T W-3'	ImPyPyImPyHp-γ-PyHpPyImImPy
10	1694) 5'-W G C C C G A A W-3'	ImPyPyImPyPy-γ-HpHpPyImImPy
	1695) 5'-W G C C C G A G W-3'	ImPyPyImPyIm-γ-PyHpPyImImPy
	1696) 5'-W G C C C G A C W-3'	ImPyPyImPyPy-γ-ImHpPyImImPy
	1697) 5'-W G C C C G G T W-3'	ImPyPyImImHp-γ-PyPyPyImImPy
	1698) 5'-W G C C C G G A W-3'	ImPyPyImImPy-γ-HpPyPyImImPy
15	1699) 5'-W G C C C G C T W-3'	ImPyPyImPyHp-γ-PyImPyImImPy
	1700) 5'-W G C C C G C A W-3'	ImPyPyImPyPy-γ-HpImPyImImPy
	1701) 5'-W G C C C C T T W-3'	ImPyPyPyHpHp-γ-PyPyImImImPy
	1702) 5'-W G C C C C T A W-3'	ImPyPyPyHpPy-γ-HpPyImImImPy
	1703) 5'-W G C C C C T G W-3'	ImPyPyPyHpIm-γ-PyPyImImImPy
	1704) 5'-W G C C C C T C W-3'	ImPyPyPyHpPy-γ-ImPyImImImPy
20	1705) 5'-W G C C C C A T W-3'	ImPyPyPyPyHp-γ-PyHpImImImPy
	1706) 5'-W G C C C C A A W-3'	ImPyPyPyPyPy-γ-HpHpImImImPy
	1707) 5'-W G C C C C A G W-3'	ImPyPyPyPyIm-γ-PyHpImImImPy
	1708) 5'-W G C C C C A C W-3'	ImPyPyPyPyPy-γ-ImHpImImImPy
	1709) 5'-W G C C C C G T W-3'	ImPyPyPyImHp-γ-PyPyImImImPy
25	1710) 5'-W G C C C C G A W-3'	ImPyPyPyImPy-γ-HpPyImImImPy
	1711) 5'-W G C C C C C T W-3'	ImPyPyPyPyHp-γ-PyImImImImPy
	1712) 5'-W G C C C C C A W-3'	ImPyPyPyPyPy-γ-HpImImImImPy
	G73) 5'-W G C C C G G G W-3'	ImPyPyImImIm-γ-PyPyPyImImPy
	G74) 5'-W G C C C G G C W-3'	ImPyPyImImPy-γ-ImPyPyImImPy
30	G75) 5'-W G C C C G C G W-3'	ImPyPyImPyIm-γ-PyImPyImImPy
	G76) 5'-W G C C C G C C W-3'	ImPyPyImPyPy-γ-ImImPyImImPy
	G77) 5'-W G C C C C G G W-3'	ImPyPyPyImIm-γ-PyPyImImImPy
	G78) 5'-W G C C C C G C W-3'	ImPyPyPyImPy-γ-ImPyImImImPy
	G79) 5'-W G C C C C C G W-3'	ImPyPyPyPyIm-γ-PyImImImImPy
35	G80) 5'-W G C C C C C C W-3'	ImPyPyPyPyPy-γ-ImImImImImPy

TABLE 100: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1713) 5'-W G A G T T T W-3'	ImPyImHpHpH _p -γ-PyPyPyPyH _p Py
	1714) 5'-W G A G T T A W-3'	ImPyImHpHpPy-γ-HpPyPyPyH _p Py
	1715) 5'-W G A G T T G W-3'	ImPyImHpHpIm-γ-PyPyPyPyH _p Py
	1716) 5'-W G A G T T C W-3'	ImPyImHpHpPy-γ-ImPyPyPyH _p Py
	1717) 5'-W G A G T A T W-3'	ImPyImHpPyH _p -γ-PyH _p PyPyH _p Py
	1718) 5'-W G A G T A A W-3'	ImPyImHpPyPy-γ-HpH _p PyPyH _p Py
10	1719) 5'-W G A G T A G W-3'	ImPyImHpPyIm-γ-PyH _p PyPyH _p Py
	1720) 5'-W G A G T A C W-3'	ImPyImHpPyPy-γ-ImHpPyPyH _p Py
	1721) 5'-W G A G T G T W-3'	ImPyImHpImHp-γ-PyPyPyPyH _p Py
	1722) 5'-W G A G T G A W-3'	ImPyImHpImPy-γ-HpPyPyPyH _p Py
	1723) 5'-W G A G T G G W-3'	ImPyImHpImIm-γ-PyPyPyPyH _p Py
15	1724) 5'-W G A G T G C W-3'	ImPyImHpImPy-γ-ImPyPyPyH _p Py
	1725) 5'-W G A G T C T W-3'	ImPyImHpPyH _p -γ-PyImPyPyH _p Py
	1726) 5'-W G A G T C A W-3'	ImPyImHpPyPy-γ-HpImPyPyH _p Py
	1727) 5'-W G A G T C G W-3'	ImPyImHpPyIm-γ-PyImPyPyH _p Py
	1728) 5'-W G A G T C C W-3'	ImPyImHpPyPy-γ-ImImPyPyH _p Py
20	1729) 5'-W G A G A T T W-3'	ImPyImPyH _p H _p -γ-PyPyH _p PyH _p Py
	1730) 5'-W G A G A T A W-3'	ImPyImPyH _p Py-γ-HpPyH _p PyH _p Py
	1731) 5'-W G A G A T G W-3'	ImPyImPyH _p Im-γ-PyPyH _p PyH _p Py
	1732) 5'-W G A G A T C W-3'	ImPyImPyH _p Py-γ-ImPyH _p PyH _p Py
	1733) 5'-W G A G A A T W-3'	ImPyImPyH _p Py-γ-PyH _p PyH _p PyH _p Py
25	1734) 5'-W G A G A A A W-3'	ImPyImPyPyPy-γ-HpH _p PyH _p Py
	1735) 5'-W G A G A A G W-3'	ImPyImPyPyIm-γ-PyH _p PyH _p Py
	1736) 5'-W G A G A A C W-3'	ImPyImPyPyPy-γ-ImHpH _p PyH _p Py
	1737) 5'-W G A G A G T W-3'	ImPyImPyImHp-γ-PyPyH _p PyH _p Py
	1738) 5'-W G A G A G A W-3'	ImPyImPyImPy-γ-HpPyH _p PyH _p Py
30	1739) 5'-W G A G A G G W-3'	ImPyImPyImIm-γ-PyPyH _p PyH _p Py
	1740) 5'-W G A G A G C W-3'	ImPyImPyImPy-γ-ImPyH _p PyH _p Py
	1741) 5'-W G A G A C T W-3'	ImPyImPyPyH _p -γ-PyImHpPyH _p Py
	1742) 5'-W G A G A C A W-3'	ImPyImPyPyPy-γ-HpImHpPyH _p Py
	1743) 5'-W G A G A C G W-3'	ImPyImPyPyIm-γ-PyImHpPyH _p Py
35	1744) 5'-W G A G A C C W-3'	ImPyImPyPyPy-γ-ImImHpPyH _p Py

TABLE 101: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAGSNNW-3'

	DNA sequence	aromatic amino acid sequence
	1745) 5'-W G A G G T T W-3'	ImPyImImH _p H _p -γ-PyPyPyPyH _p Py
5	1746) 5'-W G A G G T A W-3'	ImPyImImH _p P _y -γ-H _p PyPyPyH _p Py
	1747) 5'-W G A G G T G W-3'	ImPyImImH _p Im-γ-PyPyPyPyH _p Py
	1748) 5'-W G A G G T C W-3'	ImPyImImH _p P _y -γ-ImPyPyPyH _p Py
	1749) 5'-W G A G G A T W-3'	ImPyImImPyH _p -γ-PyH _p PyPyH _p Py
10	1750) 5'-W G A G G A A W-3'	ImPyImImPyP _y -γ-H _p H _p PyPyH _p Py
	1751) 5'-W G A G G A G W-3'	ImPyImImPyIm-γ-PyH _p PyPyH _p Py
	1752) 5'-W G A G G A C W-3'	ImPyImImPyP _y -γ-ImH _p PyPyH _p Py
	1753) 5'-W G A G G G T W-3'	ImPyImImImH _p -γ-PyPyPyPyH _p Py
	1754) 5'-W G A G G G A W-3'	ImPyImImImP _y -γ-H _p PyPyPyH _p Py
15	1755) 5'-W G A G G C T W-3'	ImPyImImPyH _p -γ-PyImPyPyH _p Py
	1756) 5'-W G A G G C A W-3'	ImPyImImPyP _y -γ-H _p ImPyPyH _p Py
	1757) 5'-W G A G C T T W-3'	ImPyImPyH _p H _p -γ-PyPyImPyH _p Py
	1758) 5'-W G A G C T A W-3'	ImPyImPyH _p P _y -γ-H _p PyImPyH _p Py
	1759) 5'-W G A G C T G W-3'	ImPyImPyH _p Im-γ-PyPyImPyH _p Py
20	1760) 5'-W G A G C T C W-3'	ImPyImPyH _p P _y -γ-ImPyImPyH _p Py
	1761) 5'-W G A G C A T W-3'	ImPyImPyPyH _p -γ-PyH _p ImPyH _p Py
	1762) 5'-W G A G C A A W-3'	ImPyImPyPyP _y -γ-H _p H _p ImPyH _p Py
	1763) 5'-W G A G C A G W-3'	ImPyImPyPyIm-γ-PyH _p ImPyH _p Py
	1764) 5'-W G A G C A C W-3'	ImPyImPyPyP _y -γ-ImH _p ImPyH _p Py
25	1765) 5'-W G A G C G T W-3'	ImPyImPyImH _p -γ-PyPyImPyH _p Py
	1766) 5'-W G A G C G A W-3'	ImPyImPyImP _y -γ-H _p PyImPyH _p Py
	1767) 5'-W G A G C C T W-3'	ImPyImPyH _p -γ-PyImImPyH _p Py
	1768) 5'-W G A G C C A W-3'	ImPyImPyPyP _y -γ-H _p ImImPyH _p Py
	1769) 5'-W G A G G G G W-3'	ImPyImImImIm-γ-PyPyPyPyH _p Py
30	1770) 5'-W G A G G G C W-3'	ImPyImImImP _y -γ-ImPyPyPyH _p Py
	1771) 5'-W G A G G C G W-3'	ImPyImImPyIm-γ-PyImPyPyH _p Py
	1772) 5'-W G A G G C C W-3'	ImPyImImPyP _y -γ-ImImPyPyH _p Py
	1773) 5'-W G A G C G G W-3'	ImPyImPyImIm-γ-PyPyImPyH _p Py
	1774) 5'-W G A G C G C W-3'	ImPyImPyImP _y -γ-ImPyImPyH _p Py
35	1775) 5'-W G A G C C G W-3'	ImPyImPyPyIm-γ-PyImImPyH _p Py
	1776) 5'-W G A G C C C W-3'	ImPyImPyPyP _y -γ-ImImImPyH _p Py

TABLE 102: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGATWNW-3'

	DNA sequence	aromatic amino acid sequence
	1777) 5'-W G A T T T T W-3'	ImPyHpHpHpHp-γ-PyPyPyPyHpPy
5	1778) 5'-W G A T T T A W-3'	ImPyHpHpHpPy-γ-HpPyPyPyHpPy
	1779) 5'-W G A T T T G W-3'	ImPyHpHpHpIm-γ-PyPyPyPyHpPy
	1780) 5'-W G A T T T C W-3'	ImPyHpHpHpPy-γ-ImPyPyPyHpPy
	1781) 5'-W G A T T A T W-3'	ImPyHpHpPyHp-γ-PyHpPyPyHpPy
	1782) 5'-W G A T T A A W-3'	ImPyHpHpPyPy-γ-HpHpPyPyHpPy
10	1783) 5'-W G A T T A G W-3'	ImPyHpHpPyIm-γ-PyHpPyPyHpPy
	1784) 5'-W G A T T A C W-3'	ImPyHpHpPyPy-γ-ImHpPyPyHpPy
	1785) 5'-W G A T T G T W-3'	ImPyHpHpImHp-γ-PyPyPyPyHpPy
	1786) 5'-W G A T T G A W-3'	ImPyHpHpImPy-γ-HpPyPyPyHpPy
	1787) 5'-W G A T T G G W-3'	ImPyHpHpImIm-γ-PyPyPyPyHpPy
15	1788) 5'-W G A T T G C W-3'	ImPyHpHpImPy-γ-ImPyPyPyHpPy
	1789) 5'-W G A T T C T W-3'	ImPyHpHpPyHp-γ-PyImPyPyHpPy
	1790) 5'-W G A T T C A W-3'	ImPyHpHpPyPy-γ-HpImPyPyHpPy
	1791) 5'-W G A T T C G W-3'	ImPyHpHpPyIm-γ-PyImPyPyHpPy
	1792) 5'-W G A T T C C W-3'	ImPyHpHpPyPy-γ-ImImPyPyHpPy
20	1793) 5'-W G A T A T T W-3'	ImPyHpPyHpHp-γ-PyPyHpPyHpPy
	1794) 5'-W G A T A T A W-3'	ImPyHpPyHpPy-γ-HpPyHpPyHpPy
	1795) 5'-W G A T A T G W-3'	ImPyHpPyHpIm-γ-PyPyHpPyHpPy
	1796) 5'-W G A T A T C W-3'	ImPyHpPyHpPy-γ-ImPyHpPyHpPy
	1797) 5'-W G A T A A T W-3'	ImPyHpPyHpPy-γ-PyHpHpPyHpPy
25	1798) 5'-W G A T A A A W-3'	ImPyHpPyPyPy-γ-HpHpHpPyHpPy
	1799) 5'-W G A T A A G W-3'	ImPyHpPyPyIm-γ-PyHpHpPyHpPy
	1800) 5'-W G A T A A C W-3'	ImPyHpPyPyPy-γ-ImHpHpPyHpPy
	1801) 5'-W G A T A G T W-3'	ImPyHpPyImHp-γ-PyPyHpPyHpPy
	1802) 5'-W G A T A G A W-3'	ImPyHpPyImPy-γ-HpPyHpPyHpPy
30	1803) 5'-W G A T A G G W-3'	ImPyHpPyImIm-γ-PyPyHpPyHpPy
	1804) 5'-W G A T A G C W-3'	ImPyHpPyImPy-γ-ImPyHpPyHpPy
	1805) 5'-W G A T A C T W-3'	ImPyHpPyPyHp-γ-PyImHpPyHpPy
	1806) 5'-W G A T A C A W-3'	ImPyHpPyPyPy-γ-HpImHpPyHpPy
	1807) 5'-W G A T A C G W-3'	ImPyHpPyPyIm-γ-PyImHpPyHpPy
35	1808) 5'-W G A T A C C W-3'	ImPyHpPyPyPy-γ-ImImHpPyHpPy

TABLE 103: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGATSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1809) 5'-W G A T G T T W-3'	ImPyHpImHpH _p -γ-PyPyPyPyH _p Py
	1810) 5'-W G A T G T A W-3'	ImPyHpImHpPy-γ-HpPyPyPyH _p Py
	1811) 5'-W G A T G T G W-3'	ImPyHpImHpIm-γ-PyPyPyPyH _p Py
	1812) 5'-W G A T G T C W-3'	ImPyHpImHpPy-γ-ImPyPyPyH _p Py
	1813) 5'-W G A T G A T W-3'	ImPyHpImPyHp-γ-PyH _p PyPyH _p Py
10	1814) 5'-W G A T G A A W-3'	ImPyHpImPyPy-γ-HpH _p PyPyH _p Py
	1815) 5'-W G A T G A G W-3'	ImPyHpImPyIm-γ-PyH _p PyPyH _p Py
	1816) 5'-W G A T G A C W-3'	ImPyHpImPyPy-γ-ImH _p PyPyH _p Py
	1817) 5'-W G A T G G T W-3'	ImPyHpImImH _p -γ-PyPyPyPyH _p Py
	1818) 5'-W G A T G G A W-3'	ImPyHpImImPy-γ-HpPyPyPyH _p Py
15	1819) 5'-W G A T G C T W-3'	ImPyHpImPyHp-γ-PyImPyPyH _p Py
	1820) 5'-W G A T G C A W-3'	ImPyHpImPyPy-γ-HpImPyPyH _p Py
	1821) 5'-W G A T G G G W-3'	ImPyHpImImIm-γ-PyPyPyPyH _p Py
	1822) 5'-W G A T G G C W-3'	ImPyHpImImPy-γ-ImPyPyPyH _p Py
	1823) 5'-W G A T G C G W-3'	ImPyHpImPyIm-γ-PyImPyPyH _p Py
20	1824) 5'-W G A T G C C W-3'	ImPyHpImPyPy-γ-ImImPyPyH _p Py
	1825) 5'-W G A T C T T W-3'	ImPyHpPyH _p H _p -γ-PyPyImPyH _p Py
	1826) 5'-W G A T C T A W-3'	ImPyHpPyH _p Py-γ-HpPyImPyH _p Py
	1827) 5'-W G A T C T G W-3'	ImPyHpPyH _p Im-γ-PyPyImPyH _p Py
	1828) 5'-W G A T C T C W-3'	ImPyHpPyH _p Py-γ-ImPyImPyH _p Py
	1829) 5'-W G A T C A T W-3'	ImPyHpPyH _p -γ-PyH _p ImPyH _p Py
25	1830) 5'-W G A T C A A W-3'	ImPyHpPyPyPy-γ-HpH _p ImPyH _p Py
	1831) 5'-W G A T C A G W-3'	ImPyHpPyPyIm-γ-PyH _p ImPyH _p Py
	1832) 5'-W G A T C A C W-3'	ImPyHpPyPyPy-γ-ImH _p ImPyH _p Py
	1833) 5'-W G A T C G T W-3'	ImPyHpPyImH _p -γ-PyPyImPyH _p Py
	1834) 5'-W G A T C G A W-3'	ImPyHpPyImPy-γ-HpPyImPyH _p Py
30	1835) 5'-W G A T C C T W-3'	ImPyHpPyPyH _p -γ-PyImImPyH _p Py
	1836) 5'-W G A T C C A W-3'	ImPyHpPyPyPy-γ-HpImImPyH _p Py
	1837) 5'-W G A T C G G W-3'	ImPyHpPyImIm-γ-PyPyImPyH _p Py
	1838) 5'-W G A T C G C W-3'	ImPyHpPyImPy-γ-ImPyImPyH _p Py
	1839) 5'-W G A T C C G W-3'	ImPyHpPyPyIm-γ-PyImImPyH _p Py
35	1840) 5'-W G A T C C C W-3'	ImPyHpPyPyPy-γ-ImImImPyH _p Py

TABLE 104: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGA_nWW-3'

	DNA sequence	aromatic amino acid sequence
5	1841) 5'-W G A A T T T W-3'	ImPyPyHpHpH _p -γ-PyPyPyHpHpPy
	1842) 5'-W G A A T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyHpHpPy
	1843) 5'-W G A A T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyHpHpPy
	1844) 5'-W G A A T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyHpHpPy
10	1845) 5'-W G A A T A T W-3'	ImPyPyHpPyH _p -γ-PyH _p PyHpHpPy
	1846) 5'-W G A A T A A W-3'	ImPyPyHpPyPy-γ-HpH _p PyHpHpPy
	1847) 5'-W G A A T A G W-3'	ImPyPyHpPyIm-γ-PyH _p PyHpHpPy
	1848) 5'-W G A A T A C W-3'	ImPyPyHpPyPy-γ-ImH _p PyHpHpPy
	1849) 5'-W G A A T G T W-3'	ImPyPyHpImH _p -γ-PyPyPyHpHpPy
15	1850) 5'-W G A A T G A W-3'	ImPyPyHpImPy-γ-HpPyPyHpHpPy
	1851) 5'-W G A A T G G W-3'	ImPyPyHpImIm-γ-PyPyPyHpHpPy
	1852) 5'-W G A A T G C W-3'	ImPyPyHpImPy-γ-ImPyPyHpHpPy
	1853) 5'-W G A A T C T W-3'	ImPyPyHpPyH _p -γ-PyImPyHpHpPy
	1854) 5'-W G A A T C A W-3'	ImPyPyHpPyPy-γ-HpImPyHpHpPy
	1855) 5'-W G A A T C G W-3'	ImPyPyHpPyIm-γ-PyImPyHpHpPy
	1856) 5'-W G A A T C C W-3'	ImPyPyHpPyPy-γ-ImImPyHpHpPy
20	1857) 5'-W G A A A T T W-3'	ImPyPyPyH _p H _p -γ-PyPyHpHpPy
	1858) 5'-W G A A A T A W-3'	ImPyPyPyH _p P _y -γ-HpPyHpHpPy
	1859) 5'-W G A A A T G W-3'	ImPyPyPyH _p Im-γ-PyPyHpHpPy
	1860) 5'-W G A A A T C W-3'	ImPyPyPyH _p Py-γ-ImPyHpHpPy
	1861) 5'-W G A A A A T W-3'	ImPyPyPyPyH _p -γ-PyH _p H _p H _p H _p Py
25	1862) 5'-W G A A A A A W-3'	ImPyPyPyPyPy-γ-HpH _p H _p H _p H _p Py
	1863) 5'-W G A A A A A G W-3'	ImPyPyPyPyIm-γ-PyH _p H _p H _p H _p Py
	1864) 5'-W G A A A A C W-3'	ImPyPyPyPyPy-γ-ImH _p H _p H _p H _p Py
	1865) 5'-W G A A A A G T W-3'	ImPyPyPyImH _p -γ-PyPyH _p H _p H _p Py
	1866) 5'-W G A A A A G A W-3'	ImPyPyPyImPy-γ-HpPyH _p H _p H _p Py
30	1867) 5'-W G A A A A G G W-3'	ImPyPyPyImIm-γ-PyPyH _p H _p H _p Py
	1868) 5'-W G A A A A G C W-3'	ImPyPyPyImPy-γ-ImPyH _p H _p H _p Py
	1869) 5'-W G A A A A C T W-3'	ImPyPyPyPyH _p -γ-PyImH _p H _p H _p Py
	1870) 5'-W G A A A A C A W-3'	ImPyPyPyPyPy-γ-HpImH _p H _p H _p Py
	1871) 5'-W G A A A A C G W-3'	ImPyPyPyPyIm-γ-PyImH _p H _p H _p Py
35	1872) 5'-W G A A A A C C W-3'	ImPyPyPyPyPy-γ-ImImH _p H _p H _p Py

TABLE 105: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGAASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1873) 5'-W G A A G T T W-3'	ImPyPyImHpH _p -γ-PyPyPyH _p H _p Py
	1874) 5'-W G A A G T A W-3'	ImPyPyImHpPy-γ-HpPyPyH _p H _p Py
	1875) 5'-W G A A G T G W-3'	ImPyPyImHpIm-γ-PyPyPyH _p H _p Py
10	1876) 5'-W G A A G T C W-3'	ImPyPyImHpPy-γ-ImPyPyH _p H _p Py
	1877) 5'-W G A A G A T W-3'	ImPyPyImPyH _p -γ-PyH _p PyH _p H _p Py
	1878) 5'-W G A A G A A W-3'	ImPyPyImPyPy-γ-HpH _p PyH _p H _p Py
15	1879) 5'-W G A A G A G W-3'	ImPyPyImPyIm-γ-PyH _p PyH _p H _p Py
	1880) 5'-W G A A G A C W-3'	ImPyPyImPyPy-γ-ImHpPyH _p H _p Py
	1881) 5'-W G A A G G T W-3'	ImPyPyImImH _p -γ-PyPyPyH _p H _p Py
	1882) 5'-W G A A G G G A W-3'	ImPyPyImImPy-γ-HpPyPyH _p H _p Py
20	1883) 5'-W G A A G C T W-3'	ImPyPyImPyH _p -γ-PyImPyH _p H _p Py
	1884) 5'-W G A A G C A W-3'	ImPyPyImPyPy-γ-HpImPyH _p H _p Py
	1885) 5'-W G A A G G G W-3'	ImPyPyImImIm-γ-PyPyPyH _p H _p Py
	1886) 5'-W G A A G G C W-3'	ImPyPyImImPy-γ-ImPyPyH _p H _p Py
25	1887) 5'-W G A A G C C G W-3'	ImPyPyImPyIm-γ-PyImPyH _p H _p Py
	1888) 5'-W G A A G C C C W-3'	ImPyPyImPyPy-γ-ImImPyH _p H _p Py
	1889) 5'-W G A A C T T W-3'	ImPyPyPyH _p H _p -γ-PyPyImHpH _p Py
	1890) 5'-W G A A C T A W-3'	ImPyPyPyH _p Py-γ-HpPyImHpH _p Py
	1891) 5'-W G A A C T G W-3'	ImPyPyPyH _p Im-γ-PyPyImHpH _p Py
	1892) 5'-W G A A C T C W-3'	ImPyPyPyH _p Py-γ-ImPyImHpH _p Py
30	1893) 5'-W G A A C A T W-3'	ImPyPyPyH _p Py-γ-PyH _p ImHpH _p Py
	1894) 5'-W G A A C A A W-3'	ImPyPyPyPyH _p -γ-HpH _p ImHpH _p Py
	1895) 5'-W G A A C A G W-3'	ImPyPyPyPyH _p Im-γ-PyH _p ImHpH _p Py
	1896) 5'-W G A A C A C W-3'	ImPyPyPyPyH _p Py-γ-ImHpImHpH _p Py
	1897) 5'-W G A A C G T W-3'	ImPyPyPyImHp-γ-PyPyImHpH _p Py
	1898) 5'-W G A A C G A W-3'	ImPyPyPyImPy-γ-HpPyImHpH _p Py
35	1899) 5'-W G A A C C T W-3'	ImPyPyPyPyH _p -γ-PyImImHpH _p Py
	1900) 5'-W G A A C C A W-3'	ImPyPyPyPyH _p Py-γ-HpImImHpH _p Py
	1901) 5'-W G A A C G G W-3'	ImPyPyPyImIm-γ-PyPyImHpH _p Py
	1902) 5'-W G A A C G C W-3'	ImPyPyPyImPy-γ-ImPyImHpH _p Py
	1903) 5'-W G A A C C G W-3'	ImPyPyPyIm-γ-PyImImHpH _p Py
	1904) 5'-W G A A C C C W-3'	ImPyPyPyPyH _p Py-γ-ImImImHpH _p Py

TABLE 106: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGACWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1905) 5'-W G A C T T T W-3'	ImPyPyHpHpHp-γ-PyPyPyImHpPy
5	1906) 5'-W G A C T T A W-3'	ImPyPyHpHpPy-γ-HpPyPyImHpPy
	1907) 5'-W G A C T T G W-3'	ImPyPyHpHpIm-γ-PyPyPyImHpPy
	1908) 5'-W G A C T T C W-3'	ImPyPyHpHpPy-γ-ImPyPyImHpPy
	1909) 5'-W G A C T A T W-3'	ImPyPyHpPyHp-γ-PyHpPyImHpPy
	1910) 5'-W G A C T A A W-3'	ImPyPyHpPyPy-γ-HpHpPyImHpPy
10	1911) 5'-W G A C T A G W-3'	ImPyPyHpPyIm-γ-PyHpPyImHpPy
	1912) 5'-W G A C T A C W-3'	ImPyPyHpPyPy-γ-ImHpPyImHpPy
	1913) 5'-W G A C T G T W-3'	ImPyPyHpImHp-γ-PyPyPyImHpPy
	1914) 5'-W G A C T G A W-3'	ImPyPyHpImPy-γ-HpPyPyImHpPy
	1915) 5'-W G A C T G G W-3'	ImPyPyHpIm-γ-PyPyPyImHpPy
15	1916) 5'-W G A C T G C W-3'	ImPyPyHpImPy-γ-ImPyPyImHpPy
	1917) 5'-W G A C T C T W-3'	ImPyPyHpPyHp-γ-PyImPyImHpPy
	1918) 5'-W G A C T C A W-3'	ImPyPyHpPyPy-γ-HpImPyImHpPy
	1919) 5'-W G A C T C G W-3'	ImPyPyHpPyIm-γ-PyImPyImHpPy
	1920) 5'-W G A C T C C W-3'	ImPyPyHpPyPy-γ-ImImPyImHpPy
20	1921) 5'-W G A C A T T W-3'	ImPyPyPyHpHp-γ-PyPyHpImHpPy
	1922) 5'-W G A C A T A W-3'	ImPyPyPyHpPy-γ-HpPyHpImHpPy
	1923) 5'-W G A C A T G W-3'	ImPyPyPyHpIm-γ-PyPyHpImHpPy
	1924) 5'-W G A C A T C W-3'	ImPyPyPyHpPy-γ-ImPyHpImHpPy
	1925) 5'-W G A C A A T W-3'	ImPyPyPyPyHp-γ-PyHpHpImHpPy
25	1926) 5'-W G A C A A A W-3'	ImPyPyPyPyPy-γ-HpHpHpImHpPy
	1927) 5'-W G A C A A G W-3'	ImPyPyPyPyIm-γ-PyHpHpImHpPy
	1928) 5'-W G A C A A C W-3'	ImPyPyPyPyPy-γ-ImHpHpImHpPy
	1929) 5'-W G A C A G T W-3'	ImPyPyPyPyImHp-γ-PyPyHpImHpPy
	1930) 5'-W G A C A G A W-3'	ImPyPyPyPyImPy-γ-HpPyHpImHpPy
30	1931) 5'-W G A C A G G W-3'	ImPyPyPyImIm-γ-PyPyHpImHpPy
	1932) 5'-W G A C A G C W-3'	ImPyPyPyImPy-γ-ImPyHpImHpPy
	1933) 5'-W G A C A C T W-3'	ImPyPyPyPyHp-γ-PyImHpImHpPy
	1934) 5'-W G A C A C A W-3'	ImPyPyPyPyPy-γ-HpImHpImHpPy
	1935) 5'-W G A C A C G W-3'	ImPyPyPyPyIm-γ-PyImHpImHpPy
35	1936) 5'-W G A C A C C W-3'	ImPyPyPyPyPy-γ-ImImHpImHpPy

TABLE 107: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGACSNW-3'

	DNA sequence	aromatic amino acid sequence
5	1937) 5'-W G A C G T T W-3'	ImPyPyImHpH γ -PyPyPyImHpPy
	1938) 5'-W G A C G T A W-3'	ImPyPyImHpPy- γ -H β pPyPyImHpPy
	1939) 5'-W G A C G T G W-3'	ImPyPyImHpIm- γ -PyPyPyImHpPy
	1940) 5'-W G A C G T C W-3'	ImPyPyImHpPy- γ -ImPyPyImHpPy
	1941) 5'-W G A C G A T W-3'	ImPyPyImPyH β - γ -PyH β pPyImHpPy
10	1942) 5'-W G A C G A A W-3'	ImPyPyImPyPy- γ -H β pH β pPyImHpPy
	1943) 5'-W G A C G A G W-3'	ImPyPyImPyIm- γ -PyH β pPyImHpPy
	1944) 5'-W G A C G A C W-3'	ImPyPyImPyPy- γ -ImHpPyImHpPy
	1945) 5'-W G A C G G T W-3'	ImPyPyImImH β - γ -PyPyPyImHpPy
	1946) 5'-W G A C G G A W-3'	ImPyPyImImPy- γ -H β pPyPyImHpPy
15	1947) 5'-W G A C G C T W-3'	ImPyPyImPyH β - γ -PyImPyImHpPy
	1948) 5'-W G A C G C A W-3'	ImPyPyImPyPy- γ -H β pImPyImHpPy
	1949) 5'-W G A C C T T W-3'	ImPyPyPyH β H β - γ -PyPyImImHpPy
	1950) 5'-W G A C C T A W-3'	ImPyPyPyH β Py- γ -H β pPyImImHpPy
	1951) 5'-W G A C C T G W-3'	ImPyPyPyH β Im- γ -PyPyImImHpPy
20	1952) 5'-W G A C C T C W-3'	ImPyPyPyH β Py- γ -ImPyImImHpPy
	1953) 5'-W G A C C A T W-3'	ImPyPyPyH β PyH β - γ -PyH β pImImHpPy
	1954) 5'-W G A C C A A W-3'	ImPyPyPyPy- γ -H β pH β pImImHpPy
	1955) 5'-W G A C C A G W-3'	ImPyPyPyPyIm- γ -PyH β pImImHpPy
	1956) 5'-W G A C C A C W-3'	ImPyPyPyPyPy- γ -ImHpImImHpPy
25	1957) 5'-W G A C C G T W-3'	ImPyPyPyImH β - γ -PyPyImImHpPy
	1958) 5'-W G A C C G A W-3'	ImPyPyPyImPy- γ -H β pPyImImHpPy
	1959) 5'-W G A C C C T W-3'	ImPyPyPyPyH β - γ -PyImImImHpPy
	1960) 5'-W G A C C C A W-3'	ImPyPyPyPyPy- γ -H β pImImImHpPy
	1961) 5'-W G A C G G G W-3'	ImPyPyImImIm- γ -PyPyPyImHpPy
	1962) 5'-W G A C G G C W-3'	ImPyPyImImPy- γ -ImPyPyImHpPy
30	1963) 5'-W G A C G C G W-3'	ImPyPyImPyIm- γ -PyImPyImHpPy
	1964) 5'-W G A C G C C W-3'	ImPyPyImPyPy- γ -ImImPyImHpPy
	1965) 5'-W G A C C G G W-3'	ImPyPyPyImIm- γ -PyPyImImHpPy
	1966) 5'-W G A C C G C W-3'	ImPyPyPyImPy- γ -ImPyImImHpPy
	1967) 5'-W G A C C C G W-3'	ImPyPyPyPyIm- γ -PyImImImHpPy
35	1968) 5'-W G A C C C C W-3'	ImPyPyPyPyPy- γ -ImImImImHpPy

TABLE 108: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1969) 5'-W G T G T T T W-3'	ImHpImHpH _p H _p -γ-PyPyPyPyPyPy
5	1970) 5'-W G T G T T A W-3'	ImHpImHpH _p H _p Py-γ-HpPyPyPyPyPy
	1971) 5'-W G T G T T G W-3'	ImHpImHpH _p Im-γ-PyPyPyPyPyPy
	1972) 5'-W G T G T T C W-3'	ImHpImHpH _p H _p -γ-ImPyPyPyPyPy
	1973) 5'-W G T G T A T W-3'	ImHpImHpPyH _p -γ-PyH _p PyPyPyPy
	1974) 5'-W G T G T A A W-3'	ImHpImHpPyPy-γ-HpH _p PyPyPy
10	1975) 5'-W G T G T A G W-3'	ImHpImHpPyIm-γ-PyH _p PyPyPy
	1976) 5'-W G T G T A C W-3'	ImHpImHpPyPy-γ-ImHpPyPyPy
	1977) 5'-W G T G T G T W-3'	ImHpImHpImHp-γ-PyPyPyPyPy
	1978) 5'-W G T G T G A W-3'	ImHpImHpImPy-γ-HpPyPyPyPy
	1979) 5'-W G T G T G G W-3'	ImHpImHpImIm-γ-PyPyPyPyPy
15	1980) 5'-W G T G T G C W-3'	ImHpImHpImPy-γ-ImPyPyPy
	1981) 5'-W G T G T C T W-3'	ImHpImHpPyH _p -γ-PyImPyPyPy
	1982) 5'-W G T G T C A W-3'	ImHpImHpPyPy-γ-HpImPyPy
	1983) 5'-W G T G T C G W-3'	ImHpImHpPyIm-γ-PyImPyPy
	1984) 5'-W G T G T C C W-3'	ImHpImHpPyPy-γ-ImImPyPy
20	1985) 5'-W G T G A T T W-3'	ImHpImPyH _p H _p -γ-PyPyH _p Py
	1986) 5'-W G T G A T A W-3'	ImHpImPyH _p Py-γ-HpPyH _p Py
	1987) 5'-W G T G A T G W-3'	ImHpImPyH _p Im-γ-PyPyH _p Py
	1988) 5'-W G T G A T C W-3'	ImHpImPyH _p Py-γ-ImPyH _p Py
	1989) 5'-W G T G A A T W-3'	ImHpImPyH _p Py-γ-PyH _p H _p Py
25	1990) 5'-W G T G A A A W-3'	ImHpImPyPyPy-γ-HpH _p Py
	1991) 5'-W G T G A A G W-3'	ImHpImPyPyIm-γ-PyH _p H _p Py
	1992) 5'-W G T G A A C W-3'	ImHpImPyPyPy-γ-ImHpH _p Py
	1993) 5'-W G T G A G T W-3'	ImHpImPyImHp-γ-PyPyH _p Py
	1994) 5'-W G T G A G A W-3'	ImHpImPyImPy-γ-HpPyH _p Py
30	1995) 5'-W G T G A G G W-3'	ImHpImPyImIm-γ-PyPyH _p Py
	1996) 5'-W G T G A G C W-3'	ImHpImPyImPy-γ-ImPyH _p Py
	1997) 5'-W G T G A C T W-3'	ImHpImPyPyH _p -γ-PyImHpPy
	1998) 5'-W G T G A C A W-3'	ImHpImPyPyPy-γ-HpImHpPy
	1999) 5'-W G T G A C G W-3'	ImHpImPyPyIm-γ-PyImHpPy
35	2000) 5'-W G T G A C C W-3'	ImHpImPyPyPy-γ-ImImHpPy

TABLE 109: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2001) 5'-W G T G G T T W-3'	ImHpImImHpHp-γ-PyPyPyPyPyPy
	2002) 5'-W G T G G T A W-3'	ImHpImImHpPy-γ-HpPyPyPyPyPy
	2003) 5'-W G T G G T G W-3'	ImHpImImHpIm-γ-PyPyPyPyPyPy
	2004) 5'-W G T G G T C W-3'	ImHpImImHpPy-γ-ImPyPyPyPyPy
	2005) 5'-W G T G G A T W-3'	ImHpImImPyHp-γ-PyHpPyPyPyPy
10	2006) 5'-W G T G G A A W-3'	ImHpImImPyPy-γ-HpHpPyPyPyPy
	2007) 5'-W G T G G A G W-3'	ImHpImImPyIm-γ-PyHpPyPyPyPy
	2008) 5'-W G T G G A C W-3'	ImHpImImPyPy-γ-ImHpPyPyPyPy
	2009) 5'-W G T G G G T W-3'	ImHpImImImHp-γ-PyPyPyPyPyPy
	2010) 5'-W G T G G G A W-3'	ImHpImImImPy-γ-HpPyPyPyPyPy
15	2011) 5'-W G T G G C T W-3'	ImHpImImPyHp-γ-PyImPyPyPyPy
	2012) 5'-W G T G G C A W-3'	ImHpImImPyPy-γ-HpImPyPyPyPy
	2013) 5'-W G T G C T T W-3'	ImHpImPyHpHp-γ-PyPyImPyPyPy
	2014) 5'-W G T G C T A W-3'	ImHpImPyHpPy-γ-HpPyImPyPyPy
	2015) 5'-W G T G C T G W-3'	ImHpImPyHpIm-γ-PyPyImPyPyPy
	2016) 5'-W G T G C T C W-3'	ImHpImPyHpPy-γ-ImPyImPyPyPy
20	2017) 5'-W G T G C A T W-3'	ImHpImPyPyHp-γ-PyHpImPyPyPy
	2018) 5'-W G T G C A A W-3'	ImHpImPyPyPy-γ-HpHpImPyPyPy
	2019) 5'-W G T G C A G W-3'	ImHpImPyPyIm-γ-PyHpImPyPyPy
	2020) 5'-W G T G C A C W-3'	ImHpImPyPyPy-γ-ImHpImPyPyPy
	2021) 5'-W G T G C G T W-3'	ImHpImPyImHp-γ-PyPyImPyPyPy
25	2022) 5'-W G T G C G A W-3'	ImHpImPyImPy-γ-HpPyImPyPyPy
	2023) 5'-W G T G C C T W-3'	ImHpImPyPyHp-γ-PyImImPyPyPy
	2024) 5'-W G T G C C A W-3'	ImHpImPyPyPy-γ-HpImImPyPyPy
	2025) 5'-W G T G G G G W-3'	ImHpImImImIm-γ-PyPyPyPyPyPy
	2026) 5'-W G T G G G C W-3'	ImHpImImImPy-γ-ImPyPyPyPyPy
30	2027) 5'-W G T G G C G W-3'	ImHpImImPyIm-γ-PyImPyPyPyPy
	2028) 5'-W G T G G C C W-3'	ImHpImImPyPy-γ-ImImPyPyPyPy
	2029) 5'-W G T G C G G W-3'	ImHpImPyImIm-γ-PyPyImPyPyPy
	2030) 5'-W G T G C G C W-3'	ImHpImPyImPy-γ-ImPyImPyPyPy
	2031) 5'-W G T G C C G W-3'	ImHpImPyPyIm-γ-PyImImPyPyPy
35	2032) 5'-W G T G C C C W-3'	ImHpImPyPyPy-γ-ImImImPyPyPy

TABLE 110: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
	2033) 5'-W G T T T T T W-3'	ImHpH _p H _p H _p H _p H _p -γ-PyPyPyPyPyPy
5	2034) 5'-W G T T T T A W-3'	ImHpH _p H _p H _p H _p Py-γ-HpPyPyPyPyPy
	2035) 5'-W G T T T T G W-3'	ImHpH _p H _p H _p Im-γ-PyPyPyPyPyPy
	2036) 5'-W G T T T T C W-3'	ImHpH _p H _p H _p H _p Py-γ-ImPyPyPyPyPy
	2037) 5'-W G T T T A T W-3'	ImHpH _p H _p PyH _p -γ-PyH _p PyPyPyPy
	2038) 5'-W G T T T A A W-3'	ImHpH _p H _p PyPy-γ-HpH _p PyPyPy
10	2039) 5'-W G T T T A G W-3'	ImHpH _p H _p PyIm-γ-PyH _p PyPyPyPy
	2040) 5'-W G T T T A C W-3'	ImHpH _p H _p PyPy-γ-ImH _p PyPyPyPy
	2041) 5'-W G T T T G T W-3'	ImHpH _p H _p ImH _p -γ-PyPyPyPyPy
	2042) 5'-W G T T T G A W-3'	ImHpH _p H _p ImPy-γ-HpPyPyPyPy
	2043) 5'-W G T T T G G W-3'	ImHpH _p H _p ImIm-γ-PyPyPyPyPy
15	2044) 5'-W G T T T G C W-3'	ImHpH _p H _p ImPy-γ-ImPyPyPyPy
	2045) 5'-W G T T T C T W-3'	ImHpH _p H _p PyH _p -γ-PyImPyPyPy
	2046) 5'-W G T T T C A W-3'	ImHpH _p H _p PyPy-γ-HpImPyPyPy
	2047) 5'-W G T T T C G W-3'	ImHpH _p H _p PyIm-γ-PyImPyPyPy
	2048) 5'-W G T T T C C W-3'	ImHpH _p H _p PyPy-γ-ImImPyPyPy
20	2049) 5'-W G T T A T T W-3'	ImHpH _p PyH _p H _p -γ-PyPyH _p PyPy
	2050) 5'-W G T T A T A W-3'	ImHpH _p PyH _p Py-γ-HpPyH _p PyPy
	2051) 5'-W G T T A T G W-3'	ImHpH _p PyH _p Im-γ-PyPyH _p PyPy
	2052) 5'-W G T T A T C W-3'	ImHpH _p PyH _p Py-γ-ImPyH _p PyPy
	2053) 5'-W G T T A A T W-3'	ImHpH _p PyPyH _p -γ-PyH _p H _p PyPy
25	2054) 5'-W G T T A A A W-3'	ImHpH _p PyPy-γ-HpH _p H _p PyPy
	2055) 5'-W G T T A A G W-3'	ImHpH _p PyPyIm-γ-PyH _p H _p PyPy
	2056) 5'-W G T T A A C W-3'	ImHpH _p PyPyPy-γ-ImH _p H _p PyPy
	2057) 5'-W G T T A G T W-3'	ImHpH _p PyImH _p -γ-PyPyH _p PyPy
	2058) 5'-W G T T A G A W-3'	ImHpH _p PyImPy-γ-HpPyH _p PyPy
30	2059) 5'-W G T T A G G W-3'	ImHpH _p PyImIm-γ-PyPyH _p PyPy
	2060) 5'-W G T T A G C W-3'	ImHpH _p PyImPy-γ-ImPyH _p PyPy
	2061) 5'-W G T T A C T W-3'	ImHpH _p PyPyH _p -γ-PyImH _p PyPy
	2062) 5'-W G T T A C A W-3'	ImHpH _p PyPy-γ-HpImH _p PyPy
	2063) 5'-W G T T A C G W-3'	ImHpH _p PyPyIm-γ-PyImH _p PyPy
35	2064) 5'-W G T T A C C W-3'	ImHpH _p PyPy-γ-ImImH _p PyPy

TABLE III: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTTSNW-3'

	DNA sequence	aromatic amino acid sequence
5	2065) 5'-W G T T G T T W-3'	ImHpHpImHpHp-γ-PyPyPyPyPyPy
	2066) 5'-W G T T G T A W-3'	ImHpHpImHpPy-γ-HpPyPyPyPyPy
	2067) 5'-W G T T G T G W-3'	ImHpHpImHpIm-γ-PyPyPyPyPyPy
	2068) 5'-W G T T G T C W-3'	ImHpHpImHpPy-γ-ImPyPyPyPyPy
	2069) 5'-W G T T G A T W-3'	ImHpHpImPyHp-γ-PyHpPyPyPyPy
10	2070) 5'-W G T T G A A W-3'	ImHpHpImPyPy-γ-HpHpPyPyPyPy
	2071) 5'-W G T T G A G W-3'	ImHpHpImPyIm-γ-PyHpPyPyPyPy
	2072) 5'-W G T T G A C W-3'	ImHpHpImPyPy-γ-ImHpPyPyPyPy
	2073) 5'-W G T T G G T W-3'	ImHpHpImImHp-γ-PyPyPyPyPyPy
	2074) 5'-W G T T G G A W-3'	ImHpHpImImPy-γ-HpPyPyPyPyPy
15	2075) 5'-W G T T G C T W-3'	ImHpHpImPyHp-γ-PyImPyPyPyPy
	2076) 5'-W G T T G C A W-3'	ImHpHpImPyPy-γ-HpImPyPyPyPy
	2077) 5'-W G T T G G G W-3'	ImHpHpImImIm-γ-PyPyPyPyPyPy
	2078) 5'-W G T T G G C W-3'	ImHpHpImImPy-γ-ImPyPyPyPyPy
	2079) 5'-W G T T G C G W-3'	ImHpHpImPyIm-γ-PyImPyPyPyPy
20	2080) 5'-W G T T G C C W-3'	ImHpHpImPyPy-γ-ImImPyPyPyPy
	2081) 5'-W G T T C T T W-3'	ImHpHpPyHpHp-γ-PyPyImPyPyPy
	2082) 5'-W G T T C T A W-3'	ImHpHpPyHpPy-γ-HpPyImPyPyPy
	2083) 5'-W G T T C T G W-3'	ImHpHpPyHpIm-γ-PyPyImPyPyPy
	2084) 5'-W G T T C T C W-3'	ImHpHpPyHpPy-γ-ImPyImPyPyPy
25	2085) 5'-W G T T C A T W-3'	ImHpHpPyHp-γ-PyHpImPyPyPy
	2086) 5'-W G T T C A A W-3'	ImHpHpPyPyPy-γ-HpHpImPyPyPy
	2087) 5'-W G T T C A G W-3'	ImHpHpPyPyIm-γ-PyHpImPyPyPy
	2088) 5'-W G T T C A C W-3'	ImHpHpPyPyPy-γ-ImHpImPyPyPy
	2089) 5'-W G T T C G T W-3'	ImHpHpPyImHp-γ-PyPyImPyPyPy
30	2090) 5'-W G T T C G A W-3'	ImHpHpPyImPy-γ-HpPyImPyPyPy
	2091) 5'-W G T T C C T W-3'	ImHpHpPyPyHp-γ-PyImImPyPyPy
	2092) 5'-W G T T C C A W-3'	ImHpHpPyPyPy-γ-HpImImPyPyPy
	2093) 5'-W G T T C G G W-3'	ImHpHpPyImIm-γ-PyPyImPyPyPy
	2094) 5'-W G T T C G C W-3'	ImHpHpPyImPy-γ-ImPyImPyPyPy
35	2095) 5'-W G T T C C G W-3'	ImHpHpPyPyIm-γ-PyImImPyPyPy
	2096) 5'-W G T T C C C W-3'	ImHpHpPyPyPy-γ-ImImImPyPyPy

TABLE 112: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTA WNNW-3'

	DNA sequence	aromatic amino acid sequence
	2097) 5'-W G T A T T T W-3'	I _m H _p P _y H _p H _p H _p -γ-P _y P _y P _y H _p P _y P _y
5	2098) 5'-W G T A T T A W-3'	I _m H _p P _y H _p H _p P _y -γ-H _p P _y P _y H _p P _y P _y
	2099) 5'-W G T A T T G W-3'	I _m H _p P _y H _p H _p I _m -γ-P _y P _y P _y H _p P _y P _y
	2100) 5'-W G T A T T C W-3'	I _m H _p P _y H _p H _p P _y -γ-I _m P _y P _y H _p P _y P _y
	2101) 5'-W G T A T A T W-3'	I _m H _p P _y H _p P _y H _p -γ-P _y H _p P _y H _p P _y P _y
10	2102) 5'-W G T A T A A W-3'	I _m H _p P _y H _p P _y P _y -γ-H _p H _p P _y H _p P _y P _y
	2103) 5'-W G T A T A G W-3'	I _m H _p P _y H _p P _y I _m -γ-P _y H _p P _y H _p P _y P _y
	2104) 5'-W G T A T A C W-3'	I _m H _p P _y H _p P _y P _y -γ-I _m H _p P _y H _p P _y P _y
	2105) 5'-W G T A T G T W-3'	I _m H _p P _y H _p I _m H _p -γ-P _y P _y P _y H _p P _y P _y
	2106) 5'-W G T A T G A W-3'	I _m H _p P _y H _p I _m P _y -γ-H _p P _y P _y H _p P _y P _y
	2107) 5'-W G T A T G G W-3'	I _m H _p P _y H _p I _m I _m -γ-P _y P _y P _y H _p P _y P _y
15	2108) 5'-W G T A T G C W-3'	I _m H _p P _y H _p I _m P _y -γ-I _m P _y P _y H _p P _y P _y
	2109) 5'-W G T A T C T W-3'	I _m H _p P _y H _p P _y H _p -γ-P _y I _m P _y H _p P _y P _y
	2110) 5'-W G T A T C A W-3'	I _m H _p P _y H _p P _y P _y -γ-H _p I _m P _y H _p P _y P _y
	2111) 5'-W G T A T C G W-3'	I _m H _p P _y H _p P _y I _m -γ-P _y I _m P _y H _p P _y P _y
	2112) 5'-W G T A T C C W-3'	I _m H _p P _y H _p P _y P _y -γ-I _m I _m P _y H _p P _y P _y
20	2113) 5'-W G T A A T T W-3'	I _m H _p P _y P _y H _p H _p -γ-P _y P _y H _p H _p P _y P _y
	2114) 5'-W G T A A T A W-3'	I _m H _p P _y P _y H _p P _y -γ-H _p P _y H _p H _p P _y P _y
	2115) 5'-W G T A A T G W-3'	I _m H _p P _y P _y H _p I _m -γ-P _y P _y H _p H _p P _y P _y
	2116) 5'-W G T A A T C W-3'	I _m H _p P _y P _y H _p P _y -γ-I _m P _y H _p H _p P _y P _y
	2117) 5'-W G T A A A T W-3'	I _m H _p P _y P _y H _p -γ-P _y H _p H _p H _p P _y P _y
25	2118) 5'-W G T A A A A W-3'	I _m H _p P _y P _y P _y P _y -γ-H _p H _p H _p H _p P _y P _y
	2119) 5'-W G T A A A G W-3'	I _m H _p P _y P _y P _y I _m -γ-P _y H _p H _p H _p P _y P _y
	2120) 5'-W G T A A A C W-3'	I _m H _p P _y P _y P _y P _y -γ-I _m H _p H _p H _p P _y P _y
	2121) 5'-W G T A A A G T W-3'	I _m H _p P _y P _y I _m H _p -γ-P _y P _y H _p H _p P _y P _y
	2122) 5'-W G T A A A G A W-3'	I _m H _p P _y P _y I _m P _y -γ-H _p P _y H _p H _p P _y P _y
30	2123) 5'-W G T A A A G G W-3'	I _m H _p P _y P _y I _m I _m -γ-P _y P _y H _p H _p P _y P _y
	2124) 5'-W G T A A A G C W-3'	I _m H _p P _y P _y I _m P _y -γ-I _m P _y H _p H _p P _y P _y
	2125) 5'-W G T A A C T W-3'	I _m H _p P _y P _y H _p -γ-P _y I _m H _p H _p P _y P _y
	2126) 5'-W G T A A C A W-3'	I _m H _p P _y P _y P _y -γ-H _p I _m H _p H _p P _y P _y
	2127) 5'-W G T A A C G W-3'	I _m H _p P _y P _y P _y I _m -γ-P _y I _m H _p H _p P _y P _y
35	2128) 5'-W G T A A C C W-3'	I _m H _p P _y P _y P _y -γ-I _m I _m H _p H _p P _y P _y

TABLE 113: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2129) 5'-W G T A G T T W-3'	ImHpPyImHpH γ -PyPyPyH γ PyPy
	2130) 5'-W G T A G T A W-3'	ImHpPyImHpPy- γ -H γ PyPyPyH γ PyPy
	2131) 5'-W G T A G T G W-3'	ImHpPyImHpIm- γ -PyPyPyH γ PyPy
	2132) 5'-W G T A G T C W-3'	ImHpPyImHpPy- γ -ImPyPyH γ PyPy
	2133) 5'-W G T A G A T W-3'	ImHpPyImPyH γ -PyH γ PyH γ PyPy
10	2134) 5'-W G T A G A A W-3'	ImHpPyImPyPy- γ -H γ PyH γ PyH γ Py
	2135) 5'-W G T A G A G W-3'	ImHpPyImPyIm- γ -PyH γ PyH γ PyPy
	2136) 5'-W G T A G A C W-3'	ImHpPyImPyPy- γ -ImH γ PyH γ PyPy
	2137) 5'-W G T A G G T W-3'	ImHpPyImImH γ -PyPyPyH γ PyPy
	2138) 5'-W G T A G G A W-3'	ImHpPyImImPy- γ -H γ PyPyH γ PyPy
15	2139) 5'-W G T A G C T W-3'	ImHpPyImPyH γ -PyImPyH γ PyPy
	2140) 5'-W G T A G C A W-3'	ImHpPyImPyPy- γ -H γ PyImPyH γ Py
	2141) 5'-W G T A G G G W-3'	ImHpPyImImIm- γ -PyPyPyH γ Py
	2142) 5'-W G T A G G C W-3'	ImHpPyImImPy- γ -ImPyPyH γ PyPy
	2143) 5'-W G T A G C G W-3'	ImHpPyImPyIm- γ -PyImPyH γ PyPy
20	2144) 5'-W G T A G C C W-3'	ImHpPyImPyPy- γ -ImImPyH γ PyPy
	2145) 5'-W G T A C T T W-3'	ImHpPyPyH γ -PyPyImH γ PyPy
	2146) 5'-W G T A C T A W-3'	ImHpPyPyH γ -PyH γ PyImH γ PyPy
	2147) 5'-W G T A C T G W-3'	ImHpPyPyH γ -PyPyImH γ PyPy
	2148) 5'-W G T A C T C W-3'	ImHpPyPyH γ -Py-ImPyImH γ PyPy
	2149) 5'-W G T A C A T W-3'	ImHpPyPyH γ -PyH γ PyImH γ PyPy
25	2150) 5'-W G T A C A A W-3'	ImHpPyPyPy- γ -H γ PyH γ ImH γ PyPy
	2151) 5'-W G T A C A G W-3'	ImHpPyPyPyIm- γ -PyH γ PyImH γ PyPy
	2152) 5'-W G T A C A C W-3'	ImHpPyPyPy- γ -ImH γ PyImH γ PyPy
	2153) 5'-W G T A C G T W-3'	ImHpPyPyImH γ -PyPyImH γ PyPy
	2154) 5'-W G T A C G A W-3'	ImHpPyPyImPy- γ -H γ PyImH γ PyPy
30	2155) 5'-W G T A C C T W-3'	ImHpPyPyH γ -PyImImH γ PyPy
	2156) 5'-W G T A C C A W-3'	ImHpPyPyPy- γ -H γ PyImImH γ PyPy
	2157) 5'-W G T A C G G W-3'	ImHpPyPyImIm- γ -PyPyImH γ PyPy
	2158) 5'-W G T A C G C W-3'	ImHpPyPyImPy- γ -ImPyImH γ PyPy
	2159) 5'-W G T A C C G W-3'	ImHpPyPyIm- γ -PyImImH γ PyPy
35	2160) 5'-W G T A C C C W-3'	ImHpPyPyPy- γ -ImImImH γ PyPy

TABLE 114: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2161) 5'-W G T C T T T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyPyPyImPyPy
	2162) 5'-W G T C T T A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpPyPyImPyPy
	2163) 5'-W G T C T T G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyPyPyImPyPy
	2164) 5'-W G T C T T C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImPyPyImPyPy
	2165) 5'-W G T C T A T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
10	2166) 5'-W G T C T A A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpH ₂ H ₂ P ₂ H ₂ P ₂
	2167) 5'-W G T C T A G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2168) 5'-W G T C T A C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImH ₂ H ₂ P ₂ H ₂ P ₂
	2169) 5'-W G T C T G T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2170) 5'-W G T C T G A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpH ₂ H ₂ P ₂ H ₂ P ₂
15	2171) 5'-W G T C T G G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2172) 5'-W G T C T G C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImPyPyImPyPy
	2173) 5'-W G T C T C T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyImPyImPyPy
	2174) 5'-W G T C T C A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpImPyImPyPy
	2175) 5'-W G T C T C G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyImPyImPyPy
	2176) 5'-W G T C T C C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImImPyImPyPy
20	2177) 5'-W G T C A T T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyPyH ₂ H ₂ P ₂ H ₂ P ₂
	2178) 5'-W G T C A T A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpPyH ₂ H ₂ P ₂ H ₂ P ₂
	2179) 5'-W G T C A T G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2180) 5'-W G T C A T C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImPyH ₂ H ₂ P ₂ H ₂ P ₂
	2181) 5'-W G T C A A T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
25	2182) 5'-W G T C A A A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpH ₂ H ₂ P ₂ H ₂ P ₂
	2183) 5'-W G T C A A G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2184) 5'-W G T C A A C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImH ₂ H ₂ P ₂ H ₂ P ₂
	2185) 5'-W G T C A G T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2186) 5'-W G T C A G A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpPyH ₂ H ₂ P ₂ H ₂ P ₂
30	2187) 5'-W G T C A G G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyH ₂ H ₂ P ₂ H ₂ P ₂
	2188) 5'-W G T C A G C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImPyH ₂ H ₂ P ₂ H ₂ P ₂
	2189) 5'-W G T C A C T W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyImH ₂ H ₂ P ₂ H ₂ P ₂
	2190) 5'-W G T C A C A W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-HpImH ₂ H ₂ P ₂ H ₂ P ₂
	2191) 5'-W G T C A C G W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-PyImH ₂ H ₂ P ₂ H ₂ P ₂
35	2192) 5'-W G T C A C C W-3'	ImHpPyH ₂ H ₂ P ₂ H ₂ P ₂ -γ-ImImH ₂ H ₂ P ₂ H ₂ P ₂

TABLE 115: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WGTCNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2193) 5'-W G T C G T T W-3'	ImHpPyImHpH γ -PyPyPyImPyPy
	2194) 5'-W G T C G T A W-3'	ImHpPyImHpPy γ -HpPyPyImPyPy
	2195) 5'-W G T C G T G W-3'	ImHpPyImHp γ -PyPyPyImPyPy
	2196) 5'-W G T C G T C W-3'	ImHpPyImHpPy γ -ImPyPyImPyPy
	2197) 5'-W G T C G A T W-3'	ImHpPyImPyH γ -PyH γ PyImPyPy
10	2198) 5'-W G T C G A A W-3'	ImHpPyImPyPy γ -H γ H γ PyImPyPy
	2199) 5'-W G T C G A G W-3'	ImHpPyImPyIm γ -PyH γ PyImPyPy
	2200) 5'-W G T C G A C W-3'	ImHpPyImPyPy γ -ImH γ PyImPyPy
	2201) 5'-W G T C G G T W-3'	ImHpPyImImH γ -PyPyPyImPyPy
	2202) 5'-W G T C G G A W-3'	ImHpPyImImPy γ -H γ PyPyPyImPyPy
15	2203) 5'-W G T C G C T W-3'	ImHpPyImPyH γ -PyImPyImPyPy
	2204) 5'-W G T C G C A W-3'	ImHpPyImPyPy γ -H γ ImPyImPyPy
	2205) 5'-W G T C C C T T W-3'	ImHpPyPyH γ Py γ -PyPyImImPyPy
	2206) 5'-W G T C C C T A W-3'	ImHpPyPyH γ Py γ -H γ PyImImPyPy
	2207) 5'-W G T C C C T G W-3'	ImHpPyPyH γ Py γ -ImPyPyImImPyPy
	2208) 5'-W G T C C C T C W-3'	ImHpPyPyH γ Py γ -ImPyImImPyPy
20	2209) 5'-W G T C C C A T W-3'	ImHpPyPyH γ Py γ -PyH γ ImImPyPy
	2210) 5'-W G T C C C A A W-3'	ImHpPyPyH γ Py γ -H γ H γ ImImPyPy
	2211) 5'-W G T C C C A G W-3'	ImHpPyPyH γ Py γ -H γ H γ ImImPyPy
	2212) 5'-W G T C C C A C W-3'	ImHpPyPyH γ Py γ -ImH γ ImImPyPy
	2213) 5'-W G T C C C G T W-3'	ImHpPyPyImH γ -PyPyImImPyPy
25	2214) 5'-W G T C C C G A W-3'	ImHpPyPyImPy γ -H γ PyImImPyPy
	2215) 5'-W G T C C C C T W-3'	ImHpPyPyH γ Py γ -PyImImImPyPy
	2216) 5'-W G T C C C C A W-3'	ImHpPyPyH γ Py γ -H γ ImImImPyPy
	2217) 5'-W G T C G G G W-3'	ImHpPyImImIm γ -PyPyPyImPyPy
	2218) 5'-W G T C G G C W-3'	ImHpPyImImPy γ -ImPyPyImPyPy
30	2219) 5'-W G T C G C C G W-3'	ImHpPyImPyIm γ -PyImPyImPyPy
	2220) 5'-W G T C G C C C W-3'	ImHpPyImPyPy γ -ImImPyImPyPy
	2221) 5'-W G T C C G G W-3'	ImHpPyPyImIm γ -PyPyImImPyPy
	2222) 5'-W G T C C G C W-3'	ImHpPyPyImPy γ -ImPyImImPyPy
	2223) 5'-W G T C C C C G W-3'	ImHpPyPyH γ Py γ -PyImImImPyPy
35	2224) 5'-W G T C C C C C W-3'	ImHpPyPyH γ Py γ -ImImImImPyPy

TABLE 116: 12-ring Hairpin Polyamides for recognition of 8-bp 5'WC GG WNNW-3'

	DNA sequence	aromatic amino acid sequence
	2225) 5'W C G G T T T W-3'	PyImImHpHpHp-γ-PyPyPyPyIm
	2226) 5'W C G G T T A W-3'	PyImImHpHpPy-γ-HpPyPyPyIm
5	2227) 5'W C G G T T G W-3'	PyImImHpHpIm-γ-PyPyPyPyIm
	2228) 5'W C G G T T C W-3'	PyImImHpHpPy-γ-ImPyPyPyIm
	2229) 5'W C G G T A T W-3'	PyImImHpPyHp-γ-PyHpPyPyIm
	2230) 5'W C G G T A A W-3'	PyImImHpPyPy-γ-HpHpPyPyIm
	2231) 5'W C G G T A G W-3'	PyImImHpPyIm-γ-PyHpPyPyIm
10	2232) 5'W C G G T A C W-3'	PyImImHpPyPy-γ-ImHpPyPyIm
	2233) 5'W C G G T G T W-3'	PyImImHpImHp-γ-PyPyPyPyIm
	2234) 5'W C G G T G A W-3'	PyImImHpImPy-γ-HpPyPyPyIm
	2235) 5'W C G G T G G W-3'	PyImImHpImIm-γ-PyPyPyPyIm
	2236) 5'W C G G T G C W-3'	PyImImHpImPy-γ-ImPyPyPyIm
15	2237) 5'W C G G T C T W-3'	PyImImHpPyHp-γ-PyImPyPyIm
	2238) 5'W C G G T C A W-3'	PyImImHpPyPy-γ-HpImPyPyIm
	2239) 5'W C G G T C G W-3'	PyImImHpPyIm-γ-PyImPyPyIm
	2240) 5'W C G G T C C W-3'	PyImImHpPyPy-γ-ImImPyPyIm
	2241) 5'W C G G A T T W-3'	PyImImPyHpHp-γ-PyPyHpPyIm
20	2242) 5'W C G G A T A W-3'	PyImImPyHpPy-γ-HpPyHpPyIm
	2243) 5'W C G G A T G W-3'	PyImImPyHpIm-γ-PyPyHpPyIm
	2244) 5'W C G G A T C W-3'	PyImImPyHpPy-γ-ImPyHpPyIm
	2245) 5'W C G G A A T W-3'	PyImImPyHp-γ-PyHpHpPyIm
	2246) 5'W C G G A A A W-3'	PyImImPyPyPy-γ-HpHpHpPyIm
25	2247) 5'W C G G A A G W-3'	PyImImPyPyIm-γ-PyHpHpPyIm
	2248) 5'W C G G A A C W-3'	PyImImPyPyPy-γ-ImHpHpPyIm
	2249) 5'W C G G A G T W-3'	PyImImPyImHp-γ-PyPyHpPyIm
	2250) 5'W C G G A G A W-3'	PyImImPyImPy-γ-HpPyHpPyIm
	2251) 5'W C G G A G G W-3'	PyImImPyImIm-γ-PyPyHpPyIm
30	2252) 5'W C G G A G C W-3'	PyImImPyImPy-γ-ImPyHpPyIm
	2253) 5'W C G G A C T W-3'	PyImImPyPyHp-γ-PyImHpPyIm
	2254) 5'W C G G A C A W-3'	PyImImPyPyPy-γ-HpImHpPyIm
	2255) 5'W C G G A C G W-3'	PyImImPyIm-γ-PyImHpPyIm
	2256) 5'W C G G A C C W-3'	PyImImPyPyPy-γ-ImImHpPyIm

TABLE 117: 12-ring Hairpin Polyamides for recognition of 8-bp 5'WCGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
	2257) 5'W C G G G T T W-3'	PyImImImHpHp-γ-PyPyPyPyPyIm
5	2258) 5'W C G G G T A W-3'	PyImImImHpPy-γ-HpPyPyPyPyIm
	2259) 5'W C G G G T G W-3'	PyImImImHpIm-γ-PyPyPyPyPyIm
	2260) 5'W C G G G T C W-3'	PyImImImHpPy-γ-ImPyPyPyPyIm
	2261) 5'W C G G G A T W-3'	PyImImImPyHp-γ-PyHpPyPyPyIm
10	2262) 5'W C G G G A A W-3'	PyImImImPyPy-γ-HpHpPyPyPyIm
	2263) 5'W C G G G A G W-3'	PyImImImPyIm-γ-PyHpPyPyPyIm
	2264) 5'W C G G G A C W-3'	PyImImImPyPy-γ-ImHpPyPyPyIm
	2265) 5'W C G G G G T W-3'	PyImImImImHp-γ-PyPyPyPyPyIm
	2266) 5'W C G G G G A W-3'	PyImImImImPy-γ-HpPyPyPyPyIm
15	2267) 5'W C G G G C T W-3'	PyImImImPyHp-γ-PyImPyPyPyIm
	2268) 5'W C G G G C A W-3'	PyImImImPyPy-γ-HpImPyPyPyIm
	2269) 5'W C G G C T T W-3'	PyImImPyHpHp-γ-PyPyImPyPyIm
	2270) 5'W C G G C T A W-3'	PyImImPyHpPy-γ-HpPyImPyPyIm
	2271) 5'W C G G C T G W-3'	PyImImPyHpIm-γ-PyPyImPyPyIm
20	2272) 5'W C G G C T C W-3'	PyImImPyHpPy-γ-ImPyImPyPyIm
	2273) 5'W C G G C A T W-3'	PyImImPyPyHp-γ-PyHpImPyPyIm
	2274) 5'W C G G C A A W-3'	PyImImPyPyPy-γ-HpHpImPyPyIm
	2275) 5'W C G G C A G W-3'	PyImImPyPyIm-γ-PyHpImPyPyIm
	2276) 5'W C G G C A C W-3'	PyImImPyPyPy-γ-ImHpImPyPyIm
25	2277) 5'W C G G C G T W-3'	PyImImPyImHp-γ-PyPyImPyPyIm
	2278) 5'W C G G C G A W-3'	PyImImPyImPy-γ-HpPyImPyPyIm
	2279) 5'W C G G C C T W-3'	PyImImPyPyHp-γ-PyImImPyPyIm
	2280) 5'W C G G C C A W-3'	PyImImPyPyPy-γ-HpImImPyPyIm
	G83) 5'W C G G G G G W-3'	PyImImImImIm-γ-PyPyPyPyPyIm
	G84) 5'W C G G G G C W-3'	PyImImImImPy-γ-ImPyPyPyPyIm
30	G85) 5'W C G G G C G W-3'	PyImImImPyIm-γ-PyImPyPyPyIm
	G86) 5'W C G G G C C W-3'	PyImImImPyPy-γ-ImImPyPyPyIm
	G87) 5'W C G G C G G W-3'	PyImImPyImIm-γ-PyPyImPyPyIm
	G88) 5'W C G G C G C W-3'	PyImImPyImPy-γ-ImPyImPyPyIm
	G89) 5'W C G G C C G W-3'	PyImImPyPyIm-γ-PyImImPyPyIm
35	G90) 5'W C G G C C C W-3'	PyImImPyPyPy-γ-ImImImPyPyIm

TABLE 118: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2281) 5'W C G T T T T W-3'	PyImHpH _p H _p H _p H _p -γ-PyPyPyPyPyIm
	2282) 5'W C G T T T T A W-3'	PyImHpH _p H _p H _p Py-γ-HpPyPyPyPyIm
	2283) 5'W C G T T T T G W-3'	PyImHpH _p H _p Im-γ-PyPyPyPyPyIm
	2284) 5'W C G T T T C W-3'	PyImHpH _p H _p Py-γ-ImPyPyPyPyIm
10	2285) 5'W C G T T A T W-3'	PyImHpH _p PyH _p -γ-PyH _p PyPyPyIm
	2286) 5'W C G T T A A W-3'	PyImHpH _p Py-γ-HpH _p PyPyPyIm
	2287) 5'W C G T T A G W-3'	PyImHpH _p PyIm-γ-PyH _p PyPyPyIm
	2288) 5'W C G T T A C W-3'	PyImHpH _p PyPy-γ-ImH _p PyPyPyIm
	2289) 5'W C G T T G T W-3'	PyImHpH _p ImH _p -γ-PyPyPyPyPyIm
15	2290) 5'W C G T T G A W-3'	PyImHpH _p ImPy-γ-HpPyPyPyPyIm
	2291) 5'W C G T T G G W-3'	PyImHpH _p ImIm-γ-PyPyPyPyPyIm
	2292) 5'W C G T T G C W-3'	PyImHpH _p ImPy-γ-ImPyPyPyPyIm
	2293) 5'W C G T T C T W-3'	PyImHpH _p PyH _p -γ-PyImPyPyPyIm
	2294) 5'W C G T T C A W-3'	PyImHpH _p PyPy-γ-HpImPyPyPyIm
	2295) 5'W C G T T C G W-3'	PyImHpH _p PyIm-γ-PyImPyPyPyIm
20	2296) 5'W C G T T C C W-3'	PyImHpH _p PyPy-γ-ImImPyPyPyIm
	2297) 5'W C G T A T T W-3'	PyImHpPyH _p H _p -γ-PyPyH _p PyPyIm
	2298) 5'W C G T A T A W-3'	PyImHpPyH _p Py-γ-HpPyH _p PyPyIm
	2299) 5'W C G T A T G W-3'	PyImHpPyH _p Im-γ-PyPyH _p PyPyIm
	2300) 5'W C G T A T C W-3'	PyImHpPyH _p Py-γ-ImPyH _p PyPyIm
	2301) 5'W C G T A A T W-3'	PyImHpPyH _p -γ-PyH _p H _p PyPyIm
25	2302) 5'W C G T A A A W-3'	PyImHpPyPy-γ-HpH _p H _p PyPyIm
	2303) 5'W C G T A A G W-3'	PyImHpPyIm-γ-PyH _p H _p PyPyIm
	2304) 5'W C G T A A C W-3'	PyImHpPyPyPy-γ-ImH _p H _p PyPyIm
	2305) 5'W C G T A G T W-3'	PyImHpPyImH _p -γ-PyPyH _p PyPyIm
	2306) 5'W C G T A G A W-3'	PyImHpPyImPy-γ-HpPyH _p PyPyIm
30	2307) 5'W C G T A G G W-3'	PyImHpPyImIm-γ-PyPyH _p PyPyIm
	2308) 5'W C G T A G C W-3'	PyImHpPyImPy-γ-ImPyH _p PyPyIm
	2309) 5'W C G T A C T W-3'	PyImHpPyPyH _p -γ-PyImH _p PyPyIm
	2310) 5'W C G T A C A W-3'	PyImHpPyPy-γ-HpImH _p PyPyIm
	2311) 5'W C G T A C G W-3'	PyImHpPyIm-γ-PyImH _p PyPyIm
35	2312) 5'W C G T A C C W-3'	PyImHpPyPy-γ-ImImH _p PyPyIm

TABLE 119: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2313) 5'W C G T G T T W-3'	PyImHpImHpH _p -γ-PyPyPyPyPyIm
	2314) 5'W C G T G T A W-3'	PyImHpImHpPy-γ-HpPyPyPyPyIm
	2315) 5'W C G T G T G W-3'	PyImHpImHpIm-γ-PyPyPyPyPyIm
	2316) 5'W C G T G T C W-3'	PyImHpImHpPy-γ-ImPyPyPyPyIm
	2317) 5'W C G T G A T W-3'	PyImHpImPyH _p -γ-PyH _p PyPyPyIm
10	2318) 5'W C G T G A A W-3'	PyImHpImPyPy-γ-HpH _p PyPyPyIm
	2319) 5'W C G T G A G W-3'	PyImHpImPyIm-γ-PyH _p PyPyPyIm
	2320) 5'W C G T G A C W-3'	PyImHpImPyPy-γ-ImH _p PyPyPyIm
	2321) 5'W C G T G G T W-3'	PyImHpImImH _p -γ-PyPyPyPyPyIm
	2322) 5'W C G T G G A W-3'	PyImHpImImPy-γ-HpPyPyPyPyIm
15	2323) 5'W C G T G C T W-3'	PyImHpImPyH _p -γ-PyImPyPyPyIm
	2324) 5'W C G T G C A W-3'	PyImHpImPyPy-γ-HpImPyPyPyIm
	2325) 5'W C G T G G G W-3'	PyImHpImImIm-γ-PyPyPyPyPyIm
	2326) 5'W C G T G G C W-3'	PyImHpImImPy-γ-ImPyPyPyPyIm
	2327) 5'W C G T G C G W-3'	PyImHpImPyIm-γ-PyImPyPyPyIm
	2328) 5'W C G T G C C W-3'	PyImHpImPyPy-γ-ImImPyPyPyIm
20	2329) 5'W C G T C T T W-3'	PyImHpPyH _p H _p -γ-PyPyImPyPyIm
	2330) 5'W C G T C T A W-3'	PyImHpPyH _p Py-γ-HpPyImPyPyIm
	2331) 5'W C G T C T G W-3'	PyImHpPyH _p Im-γ-PyPyImPyPyIm
	2332) 5'W C G T C T C W-3'	PyImHpPyH _p Py-γ-ImPyImPyPyIm
	2333) 5'W C G T C A T W-3'	PyImHpPyH _p -γ-PyH _p ImPyPyIm
25	2334) 5'W C G T C A A W-3'	PyImHpPyPyPy-γ-HpH _p ImPyPyIm
	2335) 5'W C G T C A G W-3'	PyImHpPyPyIm-γ-PyH _p ImPyPyIm
	2336) 5'W C G T C A C W-3'	PyImHpPyPyPy-γ-ImH _p ImPyPyIm
	2337) 5'W C G T C G T W-3'	PyImHpPyImH _p -γ-PyPyImPyPyIm
	2338) 5'W C G T C G A W-3'	PyImHpPyImPy-γ-HpPyImPyPyIm
30	2339) 5'W C G T C C T W-3'	PyImHpPyPyH _p -γ-PyImImPyPyIm
	2340) 5'W C G T C C A W-3'	PyImHpPyPyPy-γ-HpImImPyPyIm
	2341) 5'W C G T C G G W-3'	PyImHpPyImIm-γ-PyPyImPyPyIm
	2342) 5'W C G T C G C W-3'	PyImHpPyImPy-γ-ImPyImPyPyIm
	2343) 5'W C G T C C G W-3'	PyImHpPyPyIm-γ-PyImImPyPyIm
35	2344) 5'W C G T C C C W-3'	PyImHpPyPyPy-γ-ImImImPyPyIm

TABLE 120: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2345) 5'W C G A T T T W-3'	PyImPyHpHpH _p -γ-PyPyPyH _p PyIm
	2346) 5'W C G A T T A W-3'	PyImPyHpHpPy-γ-HpPyPyH _p PyIm
	2347) 5'W C G A T T G W-3'	PyImPyHpHpIm-γ-PyPyPyH _p PyIm
	2348) 5'W C G A T T C W-3'	PyImPyHpHpPy-γ-ImPyPyH _p PyIm
	2349) 5'W C G A T A T W-3'	PyImPyHpPyH _p -γ-PyH _p PyH _p PyIm
10	2350) 5'W C G A T A A W-3'	PyImPyHpPyPy-γ-HpH _p PyH _p PyIm
	2351) 5'W C G A T A G W-3'	PyImPyHpPyIm-γ-PyH _p PyH _p PyIm
	2352) 5'W C G A T A C W-3'	PyImPyHpPyPy-γ-ImH _p PyH _p PyIm
	2353) 5'W C G A T G T W-3'	PyImPyHpImH _p -γ-PyPyPyH _p PyIm
	2354) 5'W C G A T G A W-3'	PyImPyHpImPy-γ-HpPyPyH _p PyIm
	2355) 5'W C G A T G G W-3'	PyImPyHpImIm-γ-PyPyPyH _p PyIm
15	2356) 5'W C G A T G C W-3'	PyImPyHpImPy-γ-ImPyPyH _p PyIm
	2357) 5'W C G A T C T W-3'	PyImPyHpPyH _p -γ-PyImPyH _p PyIm
	2358) 5'W C G A T C A W-3'	PyImPyHpPyPy-γ-HpImPyH _p PyIm
	2359) 5'W C G A T C G W-3'	PyImPyHpPyIm-γ-PyImPyH _p PyIm
	2360) 5'W C G A T C C W-3'	PyImPyHpPyPy-γ-ImImPyH _p PyIm
20	2361) 5'W C G A A T T W-3'	PyImPyPyH _p H _p -γ-PyPyH _p H _p PyIm
	2362) 5'W C G A A T A W-3'	PyImPyPyH _p Py-γ-HpPyH _p H _p PyIm
	2363) 5'W C G A A T G W-3'	PyImPyPyH _p Im-γ-PyPyH _p H _p PyIm
	2364) 5'W C G A A T C W-3'	PyImPyPyH _p Py-γ-ImPyH _p H _p PyIm
	2365) 5'W C G A A A T W-3'	PyImPyPyH _p Py-γ-PyH _p H _p H _p PyIm
25	2366) 5'W C G A A A A W-3'	PyImPyPyPyH _p -γ-HpH _p H _p H _p PyIm
	2367) 5'W C G A A A G W-3'	PyImPyPyPyIm-γ-PyH _p H _p H _p PyIm
	2368) 5'W C G A A A C W-3'	PyImPyPyPyPy-γ-ImH _p H _p H _p PyIm
	2369) 5'W C G A A A G T W-3'	PyImPyPyImH _p -γ-PyPyH _p H _p PyIm
	2370) 5'W C G A A A G A W-3'	PyImPyPyImPy-γ-HpPyH _p H _p PyIm
30	2371) 5'W C G A A A G G W-3'	PyImPyPyImIm-γ-PyPyH _p H _p PyIm
	2372) 5'W C G A A A G C W-3'	PyImPyPyImPy-γ-ImPyH _p H _p PyIm
	2373) 5'W C G A A C T W-3'	PyImPyPyPyH _p -γ-PyImH _p H _p PyIm
	2374) 5'W C G A A C A W-3'	PyImPyPyPyPy-γ-HpImH _p H _p PyIm
	2375) 5'W C G A A C G W-3'	PyImPyPyPyIm-γ-PyImH _p H _p PyIm
35	2376) 5'W C G A A C C W-3'	PyImPyPyPyPy-γ-ImImH _p H _p PyIm

TABLE 121: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2377) 5'W C G A G T T W-3'	PyImPyImHpHp-γ-PyPyPyHpPyIm
	2378) 5'W C G A G T A W-3'	PyImPyImHpPy-γ-HpPyPyHpPyIm
	2379) 5'W C G A G T G W-3'	PyImPyImHpIm-γ-PyPyPyHpPyIm
	2380) 5'W C G A G T C W-3'	PyImPyImHpPy-γ-ImPyPyHpPyIm
	2381) 5'W C G A G A T W-3'	PyImPyImPyHp-γ-PyHpPyHpPyIm
10	2382) 5'W C G A G A A W-3'	PyImPyImPyPy-γ-HpHpPyHpPyIm
	2383) 5'W C G A G A G W-3'	PyImPyImPyIm-γ-PyHpPyHpPyIm
	2384) 5'W C G A G A C W-3'	PyImPyImPyPy-γ-ImHpPyHpPyIm
	2385) 5'W C G A G G T W-3'	PyImPyImImHp-γ-PyPyPyHpPyIm
	2386) 5'W C G A G G A W-3'	PyImPyImImPy-γ-HpPyPyHpPyIm
15	2387) 5'W C G A G C T W-3'	PyImPyImPyHp-γ-PyImPyHpPyIm
	2388) 5'W C G A G C A W-3'	PyImPyImPyPy-γ-HpImPyHpPyIm
	2389) 5'W C G A G G G W-3'	PyImPyImImIm-γ-PyPyPyHpPyIm
	2390) 5'W C G A G G C W-3'	PyImPyImImPy-γ-ImPyPyHpPyIm
	2391) 5'W C G A G C G W-3'	PyImPyImPyIm-γ-PyImPyHpPyIm
20	2392) 5'W C G A G C C W-3'	PyImPyImPyPy-γ-ImImPyHpPyIm
	2393) 5'W C G A C T T W-3'	PyImPyPyHpHp-γ-PyPyImHpPyIm
	2394) 5'W C G A C T A W-3'	PyImPyPyHpPy-γ-HpPyImHpPyIm
	2395) 5'W C G A C T G W-3'	PyImPyPyHpIm-γ-PyPyImHpPyIm
	2396) 5'W C G A C T C W-3'	PyImPyPyHpPy-γ-ImPyImHpPyIm
25	2397) 5'W C G A C A T W-3'	PyImPyPyHp-γ-PyHpImHpPyIm
	2398) 5'W C G A C A A W-3'	PyImPyPyPyPy-γ-HpHpImHpPyIm
	2399) 5'W C G A C A G W-3'	PyImPyPyPyIm-γ-PyHpImHpPyIm
	2400) 5'W C G A C A C W-3'	PyImPyPyPyPy-γ-ImHpImHpPyIm
	2401) 5'W C G A C G T W-3'	PyImPyImHp-γ-PyPyImHpPyIm
30	2402) 5'W C G A C G A W-3'	PyImPyPyImPy-γ-HpPyImHpPyIm
	2403) 5'W C G A C C T W-3'	PyImPyPyPyHp-γ-PyImImHpPyIm
	2404) 5'W C G A C C A W-3'	PyImPyPyPyPy-γ-HpImImHpPyIm
	2405) 5'W C G A C G G W-3'	PyImPyPyImIm-γ-PyPyImHpPyIm
	2406) 5'W C G A C G C W-3'	PyImPyPyImPy-γ-ImPyImHpPyIm
35	2407) 5'W C G A C C G W-3'	PyImPyPyIm-γ-PyImImHpPyIm
	2408) 5'W C G A C C C W-3'	PyImPyPyPyPy-γ-ImImImHpPyIm

TABLE 122: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2409) 5'W C G C T T T W-3'	PyImPyHpHpPy-γ-PyPyPyImPyIm
	2410) 5'W C G C T T A W-3'	PyImPyHpPy-γ-HpPyPyImPyIm
	2411) 5'W C G C T T G W-3'	PyImPyHpHpIm-γ-PyPyPyImPyIm
	2412) 5'W C G C T T C W-3'	PyImPyHpPy-γ-ImPyPyImPyIm
	2413) 5'W C G C T A T W-3'	PyImPyHpPyHp-γ-PyHpPyImPyIm
10	2414) 5'W C G C T A A W-3'	PyImPyHpPyPy-γ-HpHpPyImPyIm
	2415) 5'W C G C T A G W-3'	PyImPyHpPyIm-γ-PyHpPyImPyIm
	2416) 5'W C G C T A C W-3'	PyImPyHpPyPy-γ-ImHpPyImPyIm
	2417) 5'W C G C T G T W-3'	PyImPyHpImHp-γ-PyPyPyImPyIm
	2418) 5'W C G C T G A W-3'	PyImPyHpImPy-γ-HpPyPyImPyIm
15	2419) 5'W C G C T G G W-3'	PyImPyHpImIm-γ-PyPyPyImPyIm
	2420) 5'W C G C T G C W-3'	PyImPyHpImPy-γ-ImPyPyImPyIm
	2421) 5'W C G C T C T W-3'	PyImPyHpPyHp-γ-PyImPyImPyIm
	2422) 5'W C G C T C A W-3'	PyImPyHpPyPy-γ-HpImPyImPyIm
	2423) 5'W C G C T C G W-3'	PyImPyHpPyIm-γ-PyImPyImPyIm
20	2424) 5'W C G C T C C W-3'	PyImPyHpPyPy-γ-ImImPyImPyIm
	2425) 5'W C G C A T T W-3'	PyImPyPyHpHp-γ-PyPyHpImPyIm
	2426) 5'W C G C A T A W-3'	PyImPyPyHpPy-γ-HpPyHpImPyIm
	2427) 5'W C G C A T G W-3'	PyImPyPyHpIm-γ-PyPyHpImPyIm
	2428) 5'W C G C A T C W-3'	PyImPyPyHpPy-γ-ImPyHpImPyIm
25	2429) 5'W C G C A A T W-3'	PyImPyPyHp-γ-PyHpHpImPyIm
	2430) 5'W C G C A A A W-3'	PyImPyPyPyPy-γ-HpHpHpImPyIm
	2431) 5'W C G C A A G W-3'	PyImPyPyPyIm-γ-PyHpHpImPyIm
	2432) 5'W C G C A A C W-3'	PyImPyPyPyPy-γ-ImHpHpImPyIm
	2433) 5'W C G C A G T W-3'	PyImPyPyImHp-γ-PyPyHpImPyIm
30	2434) 5'W C G C A G A W-3'	PyImPyPyImPy-γ-HpPyHpImPyIm
	2435) 5'W C G C A G G W-3'	PyImPyPyImIm-γ-PyPyHpImPyIm
	2436) 5'W C G C A G C W-3'	PyImPyPyImPy-γ-ImPyHpImPyIm
	2437) 5'W C G C A C T W-3'	PyImPyPyPyHp-γ-PyImHpImPyIm
	2438) 5'W C G C A C A W-3'	PyImPyPyPyPy-γ-HpImHpImPyIm
35	2439) 5'W C G C A C G W-3'	PyImPyPyPyIm-γ-PyImHpImPyIm
	2440) 5'W C G C A C C W-3'	PyImPyPyPyPy-γ-ImImHpImPyIm

TABLE 123: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
	2441) 5'W C G C G T T W-3'	PyImPyImHpHp-γ-PyPyPyImPyIm
5	2442) 5'W C G C G T A W-3'	PyImPyImHpPy-γ-HpPyPyImPyIm
	2443) 5'W C G C G T G W-3'	PyImPyImHpIm-γ-PyPyPyImPyIm
	2444) 5'W C G C G T C W-3'	PyImPyImHpPy-γ-ImPyPyImPyIm
	2445) 5'W C G C G A T W-3'	PyImPyImPyHp-γ-PyHpPyImPyIm
10	2446) 5'W C G C G A A W-3'	PyImPyImPyPy-γ-HpHpPyImPyIm
	2447) 5'W C G C G A G W-3'	PyImPyImPyIm-γ-PyHpPyImPyIm
	2448) 5'W C G C G A C W-3'	PyImPyImPyPy-γ-ImHpPyImPyIm
	2449) 5'W C G C G G T W-3'	PyImPyImImHp-γ-PyPyPyImPyIm
	2450) 5'W C G C G G A W-3'	PyImPyImImPy-γ-HpPyPyImPyIm
15	2451) 5'W C G C G C T W-3'	PyImPyImPyHp-γ-PyImPyImPyIm
	2452) 5'W C G C G C A W-3'	PyImPyImPyPy-γ-HpImPyImPyIm
	2453) 5'W C G C C T T W-3'	PyImPyPyHpHp-γ-PyPyImImPyIm
	2454) 5'W C G C C T A W-3'	PyImPyPyHpPy-γ-HpPyImImPyIm
	2455) 5'W C G C C T G W-3'	PyImPyPyHpIm-γ-PyPyImImPyIm
20	2456) 5'W C G C C T C W-3'	PyImPyPyHpPy-γ-ImPyImImPyIm
	2457) 5'W C G C C A T W-3'	PyImPyPyPyHp-γ-PyHpImImPyIm
	2458) 5'W C G C C A A W-3'	PyImPyPyPyPy-γ-HpHpImImPyIm
	2459) 5'W C G C C A G W-3'	PyImPyPyPyIm-γ-PyHpImImPyIm
	2460) 5'W C G C C A C W-3'	PyImPyPyPyPy-γ-ImHpImImPyIm
25	2461) 5'W C G C C G T W-3'	PyImPyPyImHp-γ-PyPyImImPyIm
	2462) 5'W C G C C G A W-3'	PyImPyPyImPy-γ-HpPyImImPyIm
	2463) 5'W C G C C C T W-3'	PyImPyPyPyHp-γ-PyImImImPyIm
	2464) 5'W C G C C C A W-3'	PyImPyPyPyPy-γ-HpImImImPyIm
	G91) 5'W C G C G G G W-3'	PyImPyImImIm-γ-PyPyPyImPyIm
	G92) 5'W C G C G G C W-3'	PyImPyImImPy-γ-ImPyPyImPyIm
30	G93) 5'W C G C G C G W-3'	PyImPyImPyIm-γ-PyImPyImPyIm
	G94) 5'W C G C G C C W-3'	PyImPyImPyPy-γ-ImImPyImPyIm
	G95) 5'W C G C C G G W-3'	PyImPyPyImIm-γ-PyPyImImPyIm
	G96) 5'W C G C C G C W-3'	PyImPyPyImPy-γ-ImPyImImPyIm
	G97) 5'W C G C C C G W-3'	PyImPyPyPyIm-γ-PyImImImPyIm
35	G98) 5'W C G C C C C W-3'	PyImPyPyPyPy-γ-ImImImImPyIm

TABLE 124: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	2465) 5'W C C G T T T W-3'	PyPyImHpHpH _p -γ-PyPyPyPyImIm
5	2466) 5'W C C G T T A W-3'	PyPyImHpHpPy-γ-HpPyPyPyImIm
	2467) 5'W C C G T T G W-3'	PyPyImHpHpIm-γ-PyPyPyPyImIm
	2468) 5'W C C G T T C W-3'	PyPyImHpHpPy-γ-ImPyPyPyImIm
	2469) 5'W C C G T A T W-3'	PyPyImHpPyH _p -γ-PyH _p PyPyImIm
10	2470) 5'W C C G T A A W-3'	PyPyImHpPyPy-γ-HpHpPyPyImIm
	2471) 5'W C C G T A G W-3'	PyPyImHpPyIm-γ-PyH _p PyPyImIm
	2472) 5'W C C G T A C W-3'	PyPyImHpPyPy-γ-ImH _p PyPyImIm
	2473) 5'W C C G T G T W-3'	PyPyImHpImH _p -γ-PyPyPyPyImIm
	2474) 5'W C C G T G A W-3'	PyPyImHpImPy-γ-HpPyPyPyImIm
15	2475) 5'W C C G T G G W-3'	PyPyImHpImIm-γ-PyPyPyPyImIm
	2476) 5'W C C G T G C W-3'	PyPyImHpImPy-γ-ImPyPyPyImIm
	2477) 5'W C C G T C T W-3'	PyPyImHpPyH _p -γ-PyImPyPyImIm
	2478) 5'W C C G T C A W-3'	PyPyImHpPyPy-γ-HpImPyPyImIm
	2479) 5'W C C G T C G W-3'	PyPyImHpPyIm-γ-PyImPyPyImIm
20	2480) 5'W C C G T C C W-3'	PyPyImHpPyPy-γ-ImImPyPyImIm
	2481) 5'W C C G A T T W-3'	PyPyImPyH _p H _p -γ-PyPyH _p PyImIm
	2482) 5'W C C G A T A W-3'	PyPyImPyH _p P _y -γ-HpPyH _p PyImIm
	2483) 5'W C C G A T G W-3'	PyPyImPyH _p Im-γ-PyPyH _p PyImIm
	2484) 5'W C C G A T C W-3'	PyPyImPyH _p P _y -γ-ImPyH _p PyImIm
25	2485) 5'W C C G A A T W-3'	PyPyImPyH _p H _p -γ-PyH _p H _p PyImIm
	2486) 5'W C C G A A A W-3'	PyPyImPyPyPy-γ-HpH _p H _p PyImIm
	2487) 5'W C C G A A G W-3'	PyPyImPyPyIm-γ-PyH _p H _p PyImIm
	2488) 5'W C C G A A C W-3'	PyPyImPyPyPy-γ-ImH _p H _p PyImIm
	2489) 5'W C C G A G T W-3'	PyPyImPyImH _p -γ-PyPyH _p PyImIm
30	2490) 5'W C C G A G A W-3'	PyPyImPyImPy-γ-HpPyH _p PyImIm
	2491) 5'W C C G A G G W-3'	PyPyImPyImIm-γ-PyPyH _p PyImIm
	2492) 5'W C C G A G C W-3'	PyPyImPyImPy-γ-ImPyH _p PyImIm
	2493) 5'W C C G A C T W-3'	PyPyImPyPyH _p -γ-PyImH _p PyImIm
	2494) 5'W C C G A C A W-3'	PyPyImPyPyPy-γ-HpImH _p PyImIm
35	2495) 5'W C C G A C G W-3'	PyPyImPyPyIm-γ-PyImH _p PyImIm
	2496) 5'W C C G A C C W-3'	PyPyImPyPyPy-γ-ImImH _p PyImIm

TABLE 125: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2497) 5'W C C G G T T W-3'	PyPyImImHpHp-γ-PyPyPyPyImIm
	2498) 5'W C C G G T A W-3'	PyPyImImHpPy-γ-HpPyPyPyImIm
	2499) 5'W C C G G T G W-3'	PyPyImImHpIm-γ-PyPyPyPyImIm
	2500) 5'W C C G G T C W-3'	PyPyImImHpPy-γ-ImPyPyPyImIm
10	2501) 5'W C C G G A T W-3'	PyPyImImPyHp-γ-PyHpPyPyImIm
	2502) 5'W C C G G A A W-3'	PyPyImImPyPy-γ-HpHpPyPyImIm
	2503) 5'W C C G G A G W-3'	PyPyImImPyIm-γ-PyHpPyPyImIm
	2504) 5'W C C G G A C W-3'	PyPyImImPyPy-γ-ImHpPyPyImIm
	2505) 5'W C C G G G T W-3'	PyPyImImImHp-γ-PyPyPyPyImIm
	2506) 5'W C C G G G A W-3'	PyPyImImImPy-γ-HpPyPyPyImIm
15	2507) 5'W C C G G C T W-3'	PyPyImImPyHp-γ-PyImPyPyImIm
	2508) 5'W C C G G C A W-3'	PyPyImImPyPy-γ-HpImPyPyImIm
	2509) 5'W C C G C T T W-3'	PyPyImPyHpHp-γ-PyPyImPyImIm
	2510) 5'W C C G C T A W-3'	PyPyImPyHpPy-γ-HpPyImPyImIm
	2511) 5'W C C G C T G W-3'	PyPyImPyHpIm-γ-PyPyImPyImIm
	2512) 5'W C C G C T C W-3'	PyPyImPyHpPy-γ-ImPyImPyImIm
20	2513) 5'W C C G C A T W-3'	PyPyImPyPyHp-γ-PyHpImPyImIm
	2514) 5'W C C G C A A W-3'	PyPyImPyPyPy-γ-HpHpImPyImIm
	2515) 5'W C C G C A G W-3'	PyPyImPyPyIm-γ-PyHpImPyImIm
	2516) 5'W C C G C A C W-3'	PyPyImPyPyPy-γ-ImHpImPyImIm
	2517) 5'W C C G C G T W-3'	PyPyImPyImHp-γ-PyPyImPyImIm
25	2518) 5'W C C G C G A W-3'	PyPyImPyImPy-γ-HpPyImPyImIm
	2519) 5'W C C G C C T W-3'	PyPyImPyPyHp-γ-PyImImPyImIm
	2520) 5'W C C G C C A W-3'	PyPyImPyPyPy-γ-HpImImPyImIm
	G99) 5'W C C G G G G W-3'	PyPyImImImIm-γ-PyPyPyPyImIm
	G100) 5'W C C G G G C W-3'	PyPyImImImPy-γ-ImPyPyPyImIm
30	G101) 5'W C C G G C G W-3'	PyPyImImPyIm-γ-PyImPyPyImIm
	G102) 5'W C C G G C C W-3'	PyPyImImPyPy-γ-ImImPyPyImIm
	G103) 5'W C C G C G G W-3'	PyPyImPyImIm-γ-PyPyImPyImIm
	G104) 5'W C C G C G C W-3'	PyPyImPyImPy-γ-ImPyImPyImIm
	G105) 5'W C C G C C G W-3'	PyPyImPyPyIm-γ-PyImImPyImIm
35	G106) 5'W C C G C C C W-3'	PyPyImPyPyPy-γ-ImImImPyImIm

TABLE 126: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCTWNW-3'

	DNA sequence	aromatic amino acid sequence
	2521) 5'W C C T T T T W-3'	PyPyHpHpHpH _p -γ-PyPyPyPyImIm
5	2522) 5'W C C T T T A W-3'	PyPyHpHpHpPy-γ-HpPyPyPyImIm
	2523) 5'W C C T T T G W-3'	PyPyHpHpHpIm-γ-PyPyPyPyImIm
	2524) 5'W C C T T T C W-3'	PyPyHpHpHpPy-γ-ImPyPyPyImIm
	2525) 5'W C C T T A T W-3'	PyPyHpHpPyH _p -γ-PyH _p PyPyImIm
	2526) 5'W C C T T A A W-3'	PyPyHpHpPyPy-γ-HpH _p PyPyImIm
10	2527) 5'W C C T T A G W-3'	PyPyHpHpPyIm-γ-PyH _p PyPyImIm
	2528) 5'W C C T T A C W-3'	PyPyHpHpPyPy-γ-ImH _p PyPyImIm
	2529) 5'W C C T T G T W-3'	PyPyHpHpImH _p -γ-PyPyPyPyImIm
	2530) 5'W C C T T G A W-3'	PyPyHpHpImPy-γ-HpPyPyPyImIm
	2531) 5'W C C T T G G W-3'	PyPyHpHpImIm-γ-PyPyPyPyImIm
15	2532) 5'W C C T T G C W-3'	PyPyHpHpImPy-γ-ImPyPyPyImIm
	2533) 5'W C C T T C T W-3'	PyPyHpHpPyH _p -γ-PyImPyPyImIm
	2534) 5'W C C T T C A W-3'	PyPyHpHpPyPy-γ-HpImPyPyImIm
	2535) 5'W C C T T C G W-3'	PyPyHpHpPyIm-γ-PyImPyPyImIm
	2536) 5'W C C T T C C W-3'	PyPyHpHpPyPy-γ-ImImPyPyImIm
20	2537) 5'W C C T A T T W-3'	PyPyHpPyH _p H _p -γ-PyPyH _p PyImIm
	2538) 5'W C C T A T A W-3'	PyPyHpPyH _p Py-γ-HpPyH _p PyImIm
	2539) 5'W C C T A T G W-3'	PyPyHpPyH _p Im-γ-PyPyH _p PyImIm
	2540) 5'W C C T A T C W-3'	PyPyHpPyH _p Py-γ-ImPyH _p PyImIm
	2541) 5'W C C T A A T W-3'	PyPyHpPyH _p Py-γ-PyH _p H _p PyImIm
25	2542) 5'W C C T A A A W-3'	PyPyHpPyPyPy-γ-HpH _p H _p PyImIm
	2543) 5'W C C T A A G W-3'	PyPyHpPyPyIm-γ-PyH _p H _p PyImIm
	2544) 5'W C C T A A C W-3'	PyPyHpPyPyPy-γ-ImH _p H _p PyImIm
	2545) 5'W C C T A G T W-3'	PyPyHpPyImH _p -γ-PyPyH _p PyImIm
	2546) 5'W C C T A G A W-3'	PyPyHpPyImPy-γ-HpPyH _p PyImIm
30	2547) 5'W C C T A G G W-3'	PyPyHpPyImIm-γ-PyPyH _p PyImIm
	2548) 5'W C C T A G C W-3'	PyPyHpPyImPy-γ-ImPyH _p PyImIm
	2549) 5'W C C T A C T W-3'	PyPyHpPyPyH _p -γ-PyImH _p PyImIm
	2550) 5'W C C T A C A W-3'	PyPyHpPyPyPy-γ-HpImH _p PyImIm
	2551) 5'W C C T A C G W-3'	PyPyHpPyPyIm-γ-PyImH _p PyImIm
35	2552) 5'W C C T A C C W-3'	PyPyHpPyPyPy-γ-ImImH _p PyImIm

TABLE 127: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2553) 5'W C C T G T T W-3'	PyPyHpImHpHp-γ-PyPyPyPyImIm
	2554) 5'W C C T G T A W-3'	PyPyHpImHpPy-γ-HpPyPyPyImIm
	2555) 5'W C C T G T G W-3'	PyPyHpImHpIm-γ-PyPyPyPyImIm
	2556) 5'W C C T G T C W-3'	PyPyHpImHpPy-γ-ImPyPyPyImIm
	2557) 5'W C C T G A T W-3'	PyPyHpImPyHp-γ-PyHpPyPyImIm
10	2558) 5'W C C T G A A W-3'	PyPyHpImPyPy-γ-HpHpPyPyImIm
	2559) 5'W C C T G A G W-3'	PyPyHpImPyIm-γ-PyHpPyPyImIm
	2560) 5'W C C T G A C W-3'	PyPyHpImPyPy-γ-ImHpPyPyImIm
	2561) 5'W C C T G G T W-3'	PyPyHpImImHp-γ-PyPyPyPyImIm
	2562) 5'W C C T G G A W-3'	PyPyHpImImPy-γ-HpPyPyPyImIm
15	2563) 5'W C C T G C T W-3'	PyPyHpImPyHp-γ-PyImPyPyImIm
	2564) 5'W C C T G C A W-3'	PyPyHpImPyPy-γ-HpImPyPyImIm
	2565) 5'W C C T G G G W-3'	PyPyHpImImIm-γ-PyPyPyPyImIm
	2566) 5'W C C T G G C W-3'	PyPyHpImImPy-γ-ImPyPyPyImIm
	2567) 5'W C C T G C G W-3'	PyPyHpImPyIm-γ-PyImPyPyImIm
20	2568) 5'W C C T G C C W-3'	PyPyHpImPyPy-γ-ImImPyPyImIm
	2569) 5'W C C T C T T W-3'	PyPyHpPyHpHp-γ-PyPyImPyImIm
	2570) 5'W C C T C T A W-3'	PyPyHpPyHpPy-γ-HpPyImPyImIm
	2571) 5'W C C T C T G W-3'	PyPyHpPyHpIm-γ-PyPyImPyImIm
	2572) 5'W C C T C T C W-3'	PyPyHpPyHpPy-γ-ImPyImPyImIm
25	2573) 5'W C C T C A T W-3'	PyPyHpPyPyHp-γ-PyHpImPyImIm
	2574) 5'W C C T C A A W-3'	PyPyHpPyPyPy-γ-HpHpImPyImIm
	2575) 5'W C C T C A G W-3'	PyPyHpPyPyIm-γ-PyHpImPyImIm
	2576) 5'W C C T C A C W-3'	PyPyHpPyPyPy-γ-ImHpImPyImIm
	2577) 5'W C C T C G T W-3'	PyPyHpPyImHp-γ-PyPyImPyImIm
30	2578) 5'W C C T C G A W-3'	PyPyHpPyImPy-γ-HpPyImPyImIm
	2579) 5'W C C T C C T W-3'	PyPyHpPyPyHp-γ-PyImImPyImIm
	2580) 5'W C C T C C A W-3'	PyPyHpPyPyPy-γ-HpImImPyImIm
	2581) 5'W C C T C G G W-3'	PyPyHpPyImIm-γ-PyPyImPyImIm
	2582) 5'W C C T C G C W-3'	PyPyHpPyImPy-γ-ImPyImPyImIm
35	2583) 5'W C C T C C G W-3'	PyPyHpPyPyIm-γ-PyImImPyImIm
	2584) 5'W C C T C C C W-3'	PyPyHpPyPyPy-γ-ImImImPyImIm

TABLE 128: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2585) 5'W C C A T T T W-3'	PyPyPyH _p H _p H _p -γ-PyPyPyH _p I _m I _m
	2586) 5'W C C A T T A W-3'	PyPyPyH _p H _p P _y -γ-H _p P _y P _y H _p I _m I _m
	2587) 5'W C C A T T G W-3'	PyPyPyH _p H _p I _m -γ-PyPyPyH _p I _m I _m
	2588) 5'W C C A T T C W-3'	PyPyPyH _p H _p P _y -γ-I _m P _y P _y H _p I _m I _m
	2589) 5'W C C A T A T W-3'	PyPyPyH _p P _y H _p -γ-PyH _p P _y H _p I _m I _m
10	2590) 5'W C C A T A A W-3'	PyPyPyH _p P _y P _y -γ-H _p H _p P _y H _p I _m I _m
	2591) 5'W C C A T A G W-3'	PyPyPyH _p P _y I _m -γ-PyH _p P _y H _p I _m I _m
	2592) 5'W C C A T A C W-3'	PyPyPyH _p P _y P _y -γ-I _m H _p P _y H _p I _m I _m
	2593) 5'W C C A T G T W-3'	PyPyPyH _p I _m H _p -γ-PyPyPyH _p I _m I _m
	2594) 5'W C C A T G A W-3'	PyPyPyH _p I _m P _y -γ-H _p P _y P _y H _p I _m I _m
	2595) 5'W C C A T G G W-3'	PyPyPyH _p I _m I _m -γ-PyPyPyH _p I _m I _m
15	2596) 5'W C C A T G C W-3'	PyPyPyH _p I _m P _y -γ-I _m P _y P _y H _p I _m I _m
	2597) 5'W C C A T C T W-3'	PyPyPyH _p P _y H _p -γ-PyI _m P _y H _p I _m I _m
	2598) 5'W C C A T C A W-3'	PyPyPyH _p P _y P _y -γ-H _p I _m P _y H _p I _m I _m
	2599) 5'W C C A T C G W-3'	PyPyPyH _p P _y I _m -γ-PyI _m P _y H _p I _m I _m
	2600) 5'W C C A T C C W-3'	PyPyPyH _p P _y P _y -γ-I _m I _m P _y H _p I _m I _m
20	2601) 5'W C C A A T T W-3'	PyPyPyPyH _p -γ-PyPyH _p H _p I _m I _m
	2602) 5'W C C A A T A W-3'	PyPyPyPyH _p P _y -γ-H _p P _y H _p H _p I _m I _m
	2603) 5'W C C A A T G W-3'	PyPyPyPyH _p I _m -γ-PyPyH _p H _p I _m I _m
	2604) 5'W C C A A T C W-3'	PyPyPyPyH _p P _y -γ-I _m P _y H _p H _p I _m I _m
	2605) 5'W C C A A A T W-3'	PyPyPyPyH _p P _y -γ-PyH _p H _p H _p I _m I _m
25	2606) 5'W C C A A A A W-3'	PyPyPyPyPyH _p -γ-H _p H _p H _p H _p I _m I _m
	2607) 5'W C C A A A G W-3'	PyPyPyPyPyI _m -γ-PyH _p H _p H _p I _m I _m
	2608) 5'W C C A A A C W-3'	PyPyPyPyPyH _p -γ-I _m H _p H _p H _p I _m I _m
	2609) 5'W C C A A G T W-3'	PyPyPyPyI _m H _p -γ-PyPyH _p H _p I _m I _m
	2610) 5'W C C A A G A W-3'	PyPyPyPyI _m P _y -γ-H _p P _y H _p H _p I _m I _m
30	2611) 5'W C C A A G G W-3'	PyPyPyPyI _m I _m -γ-PyPyH _p H _p I _m I _m
	2612) 5'W C C A A G C W-3'	PyPyPyPyI _m P _y -γ-I _m P _y H _p H _p I _m I _m
	2613) 5'W C C A A C T W-3'	PyPyPyPyH _p -γ-PyI _m H _p H _p I _m I _m
	2614) 5'W C C A A C A W-3'	PyPyPyPyP _y H _p -γ-H _p I _m H _p H _p I _m I _m
	2615) 5'W C C A A C G W-3'	PyPyPyPyP _y I _m -γ-PyI _m H _p H _p I _m I _m
35	2616) 5'W C C A A C C W-3'	PyPyPyPyP _y -γ-I _m I _m H _p H _p I _m I _m

TABLE 129: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2617) 5'W C C A G T T W-3'	PyPyPyImHpHp-γ-PyPyPyHpImIm
	2618) 5'W C C A G T A W-3'	PyPyPyImHpPy-γ-HpPyPyHpImIm
	2619) 5'W C C A G T G W-3'	PyPyPyImHpIm-γ-PyPyPyHpImIm
	2620) 5'W C C A G T C W-3'	PyPyPyImHpPy-γ-ImPyPyHpImIm
	2621) 5'W C C A G A T W-3'	PyPyPyImPyHp-γ-PyHpPyHpImIm
10	2622) 5'W C C A G A A W-3'	PyPyPyImPyPy-γ-HpHpPyHpImIm
	2623) 5'W C C A G A G W-3'	PyPyPyImPyIm-γ-PyHpPyHpImIm
	2624) 5'W C C A G A C W-3'	PyPyPyImPyPy-γ-ImHpPyHpImIm
	2625) 5'W C C A G G T W-3'	PyPyPyImImHp-γ-PyPyPyHpImIm
	2626) 5'W C C A G G A W-3'	PyPyPyImImPy-γ-HpPyPyHpImIm
15	2627) 5'W C C A G C T W-3'	PyPyPyImPyHp-γ-PyImPyHpImIm
	2628) 5'W C C A G C A W-3'	PyPyPyImPyPy-γ-HpImPyHpImIm
	2629) 5'W C C A G G G W-3'	PyPyPyImImIm-γ-PyPyPyHpImIm
	2630) 5'W C C A G G C W-3'	PyPyPyImImPy-γ-ImPyPyHpImIm
	2631) 5'W C C A G C G W-3'	PyPyPyImPyIm-γ-PyImPyHpImIm
20	2632) 5'W C C A G C C W-3'	PyPyPyImPyPy-γ-ImImPyHpImIm
	2633) 5'W C C A C T T W-3'	PyPyPyPyHpHp-γ-PyPyImHpImIm
	2634) 5'W C C A C T A W-3'	PyPyPyPyHpPy-γ-HpPyImHpImIm
	2635) 5'W C C A C T G W-3'	PyPyPyPyHpIm-γ-PyPyImHpImIm
	2636) 5'W C C A C T C W-3'	PyPyPyPyHpPy-γ-ImPyImHpImIm
25	2637) 5'W C C A C A T W-3'	PyPyPyPyPyHp-γ-PyHpImHpImIm
	2638) 5'W C C A C A A W-3'	PyPyPyPyPyPy-γ-HpHpImHpImIm
	2639) 5'W C C A C A G W-3'	PyPyPyPyPyIm-γ-PyHpImHpImIm
	2640) 5'W C C A C A C W-3'	PyPyPyPyPyPyPy-γ-ImHpImHpImIm
	2641) 5'W C C A C G T W-3'	PyPyPyPyPyImHp-γ-PyPyImHpImIm
30	2642) 5'W C C A C G A W-3'	PyPyPyPyPyImPy-γ-HpPyImHpImIm
	2643) 5'W C C A C C T W-3'	PyPyPyPyPyHp-γ-PyImImHpImIm
	2644) 5'W C C A C C A W-3'	PyPyPyPyPyPy-γ-HpImImHpImIm
	2645) 5'W C C A C G G W-3'	PyPyPyPyImIm-γ-PyPyImHpImIm
	2646) 5'W C C A C G C W-3'	PyPyPyPyImPy-γ-ImPyImHpImIm
35	2647) 5'W C C A C C G W-3'	PyPyPyPyPyIm-γ-PyImImHpImIm
	2648) 5'W C C A C C C W-3'	PyPyPyPyPyPy-γ-ImImImHpImIm

TABLE 130: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2649) 5'W C C C T T T W-3'	PyPyPyH _p H _p H _p -γ-PyPyPyImImIm
	2650) 5'W C C C T T A W-3'	PyPyPyH _p H _p P _y -γ-H _p P _y P _y ImImIm
	2651) 5'W C C C T T G W-3'	PyPyPyH _p H _p Im-γ-PyPyPyImImIm
	2652) 5'W C C C T T C W-3'	PyPyPyH _p H _p P _y -γ-ImPyPyImImIm
	2653) 5'W C C C T A T W-3'	PyPyPyH _p P _y H _p -γ-PyH _p P _y ImImIm
10	2654) 5'W C C C T A A W-3'	PyPyPyH _p P _y P _y -γ-H _p H _p P _y ImImIm
	2655) 5'W C C C T A G W-3'	PyPyPyH _p P _y Im-γ-PyH _p P _y ImImIm
	2656) 5'W C C C T A C W-3'	PyPyPyH _p P _y P _y -γ-ImH _p P _y ImImIm
	2657) 5'W C C C T G T W-3'	PyPyPyH _p ImH _p -γ-PyPyPyImImIm
	2658) 5'W C C C T G A W-3'	PyPyPyH _p ImPy-γ-H _p P _y P _y ImImIm
	2659) 5'W C C C T G G W-3'	PyPyPyH _p ImIm-γ-PyPyPyImImIm
15	2660) 5'W C C C T G C W-3'	PyPyPyH _p ImPy-γ-ImPyPyImImIm
	2661) 5'W C C C T C T W-3'	PyPyPyH _p P _y H _p -γ-PyImPyImImIm
	2662) 5'W C C C T C A W-3'	PyPyPyH _p P _y P _y -γ-H _p ImPyImImIm
	2663) 5'W C C C T C G W-3'	PyPyPyH _p Im-γ-PyImPyImImIm
	2664) 5'W C C C T C C W-3'	PyPyPyH _p P _y P _y -γ-ImImPyImImIm
20	2665) 5'W C C C A T T W-3'	PyPyPyPyH _p H _p -γ-PyPyH _p ImImIm
	2666) 5'W C C C A T A W-3'	PyPyPyPyH _p P _y -γ-H _p P _y H _p ImImIm
	2667) 5'W C C C A T G W-3'	PyPyPyPyH _p Im-γ-PyPyH _p ImImIm
	2668) 5'W C C C A T C W-3'	PyPyPyPyH _p P _y -γ-ImPyH _p ImImIm
	2669) 5'W C C C A A T W-3'	PyPyPyPyH _p H _p -γ-PyH _p H _p ImImIm
25	2670) 5'W C C C A A A W-3'	PyPyPyPyPy-γ-H _p H _p H _p ImImIm
	2671) 5'W C C C A A G W-3'	PyPyPyPyPyIm-γ-PyH _p H _p ImImIm
	2672) 5'W C C C A A C W-3'	PyPyPyPyPyP _y -γ-ImH _p H _p ImImIm
	2673) 5'W C C C A G T W-3'	PyPyPyPyImH _p -γ-PyPyH _p ImImIm
	2674) 5'W C C C A G A W-3'	PyPyPyPyImPy-γ-H _p P _y H _p ImImIm
30	2675) 5'W C C C A G G W-3'	PyPyPyPyImIm-γ-PyPyH _p ImImIm
	2676) 5'W C C C A G C W-3'	PyPyPyPyImPy-γ-ImPyH _p ImImIm
	2677) 5'W C C C A C T W-3'	PyPyPyPyPyH _p -γ-PyImH _p ImImIm
	2678) 5'W C C C A C A W-3'	PyPyPyPyPyP _y -γ-H _p ImH _p ImImIm
	2679) 5'W C C C A C G W-3'	PyPyPyPyPyIm-γ-PyImH _p ImImIm
35	2680) 5'W C C C A C C W-3'	PyPyPyPyPyP _y -γ-ImImH _p ImImIm

TABLE 131: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCCSNNW-3'

	DNA sequence	aromatic amino acid sequence
	2681) 5'W C C C G T T W-3'	PyPyPyImHpHp-γ-PyPyPyImImIm
5	2682) 5'W C C C G T A W-3'	PyPyPyImHpPy-γ-HpPyPyImImIm
	2683) 5'W C C C G T G W-3'	PyPyPyImHpIm-γ-PyPyPyImImIm
	2684) 5'W C C C G T C W-3'	PyPyPyImHpPy-γ-ImPyPyImImIm
	2685) 5'W C C C G A T W-3'	PyPyPyImPyHp-γ-PyHpPyImImIm
10	2686) 5'W C C C G A A W-3'	PyPyPyImPyPy-γ-HpHpPyImImIm
	2687) 5'W C C C G A G W-3'	PyPyPyImPyIm-γ-PyHpPyImImIm
	2688) 5'W C C C G A C W-3'	PyPyPyImPyPy-γ-ImHpPyImImIm
	2689) 5'W C C C G G T W-3'	PyPyPyImImHp-γ-PyPyPyImImIm
	2690) 5'W C C C G G A W-3'	PyPyPyImImPy-γ-HpPyPyImImIm
15	2691) 5'W C C C G C T W-3'	PyPyPyImPyHp-γ-PyImPyImImIm
	2692) 5'W C C C G C A W-3'	PyPyPyImPyPy-γ-HpImPyImImIm
	2693) 5'W C C C C T T W-3'	PyPyPyPyHpHp-γ-PyPyImImImIm
	2694) 5'W C C C C T A W-3'	PyPyPyPyHpPy-γ-HpPyImImImIm
	2695) 5'W C C C C T G W-3'	PyPyPyPyHpIm-γ-PyPyImImImIm
20	2696) 5'W C C C C T C W-3'	PyPyPyPyHpPy-γ-ImPyImImImIm
	2697) 5'W C C C C A T W-3'	PyPyPyPyPyHp-γ-PyHpImImImIm
	2698) 5'W C C C C A A W-3'	PyPyPyPyPyPy-γ-HpHpImImImIm
	2699) 5'W C C C C A G W-3'	PyPyPyPyPyIm-γ-PyHpImImImIm
	2700) 5'W C C C C A C W-3'	PyPyPyPyPyPy-γ-ImHpImImImIm
25	2701) 5'W C C C C G T W-3'	PyPyPyPyImHp-γ-PyPyImImImIm
	2702) 5'W C C C C G A W-3'	PyPyPyPyImPy-γ-HpPyImImImIm
	2703) 5'W C C C C C T W-3'	PyPyPyPyPyHp-γ-PyImImImImIm
	2704) 5'W C C C C C A W-3'	PyPyPyPyPyPy-γ-HpImImImImIm
	G107) 5'W C C C G G G W-3'	PyPyPyImImIm-γ-PyPyPyImImIm
	G108) 5'W C C C G G C W-3'	PyPyPyImImPy-γ-ImPyPyImImIm
30	G109) 5'W C C C G C G W-3'	PyPyPyImPyIm-γ-PyImPyImImIm
	G110) 5'W C C C G C C W-3'	PyPyPyImPyPy-γ-ImImPyImImIm
	G111) 5'W C C C C G G W-3'	PyPyPyPyImIm-γ-PyPyImImImIm
	G112) 5'W C C C C G C W-3'	PyPyPyPyImPy-γ-ImPyImImImIm
	G113) 5'W C C C C C G W-3'	PyPyPyPyPyIm-γ-PyImImImImIm
35	G114) 5'W C C C C C C W-3'	PyPyPyPyPyPy-γ-ImImImImImIm

TABLE 132: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2705) 5'W C A G T T T W-3'	PyPyImHpHpH _p -γ-PyPyPyPyH _p I _m
	2706) 5'W C A G T T A W-3'	PyPyImHpHpPy-γ-HpPyPyPyH _p I _m
	2707) 5'W C A G T T G W-3'	PyPyImHpHpI _m -γ-PyPyPyPyH _p I _m
	2708) 5'W C A G T T C W-3'	PyPyImHpHpPy-γ-I _m PyPyPyH _p I _m
	2709) 5'W C A G T A T W-3'	PyPyImHpPyH _p -γ-PyH _p PyPyH _p I _m
10	2700) 5'W C A G T A A W-3'	PyPyImHpPyPy-γ-HpH _p PyPyH _p I _m
	2711) 5'W C A G T A G W-3'	PyPyImHpPyI _m -γ-PyH _p PyPyH _p I _m
	2712) 5'W C A G T A C W-3'	PyPyImHpPyPy-γ-I _m H _p PyPyH _p I _m
	2713) 5'W C A G T G T W-3'	PyPyImHpI _m H _p -γ-PyPyPyPyH _p I _m
	2714) 5'W C A G T G A W-3'	PyPyImHpI _m Py-γ-HpPyPyPyH _p I _m
	2715) 5'W C A G T G G W-3'	PyPyImHpI _m I _m -γ-PyPyPyPyH _p I _m
15	2716) 5'W C A G T G C W-3'	PyPyImHpI _m Py-γ-I _m PyPyPyH _p I _m
	2717) 5'W C A G T C T W-3'	PyPyImHpPyH _p -γ-PyI _m PyPyH _p I _m
	2718) 5'W C A G T C A W-3'	PyPyImHpPyPy-γ-HpI _m PyPyH _p I _m
	2719) 5'W C A G T C G W-3'	PyPyImHpPyI _m -γ-PyI _m PyPyH _p I _m
	2720) 5'W C A G T C C W-3'	PyPyImHpPyPy-γ-I _m I _m PyPyH _p I _m
20	2721) 5'W C A G A T T W-3'	PyPyImPyH _p H _p -γ-PyPyH _p PyH _p I _m
	2722) 5'W C A G A T A W-3'	PyPyImPyH _p Py-γ-HpPyH _p PyH _p I _m
	2723) 5'W C A G A T G W-3'	PyPyImPyH _p I _m -γ-PyPyH _p PyH _p I _m
	2724) 5'W C A G A T C W-3'	PyPyImPyH _p Py-γ-I _m PyH _p PyH _p I _m
	2725) 5'W C A G A A T W-3'	PyPyImPyH _p Py-γ-PyH _p H _p PyH _p I _m
25	2726) 5'W C A G A A A W-3'	PyPyImPyPyPy-γ-HpH _p H _p PyH _p I _m
	2727) 5'W C A G A A G W-3'	PyPyImPyPyI _m -γ-PyH _p H _p PyH _p I _m
	2728) 5'W C A G A A C W-3'	PyPyImPyPyPy-γ-I _m H _p H _p PyH _p I _m
	2729) 5'W C A G A G T W-3'	PyPyImPyI _m H _p -γ-PyPyH _p PyH _p I _m
	2730) 5'W C A G A G A W-3'	PyPyImPyI _m Py-γ-HpPyH _p PyH _p I _m
30	2731) 5'W C A G A G G W-3'	PyPyImPyI _m I _m -γ-PyPyH _p PyH _p I _m
	2732) 5'W C A G A G C W-3'	PyPyImPyI _m Py-γ-I _m PyH _p PyH _p I _m
	2733) 5'W C A G A C T W-3'	PyPyImPyPyH _p -γ-PyI _m H _p PyH _p I _m
	2734) 5'W C A G A C A W-3'	PyPyImPyPyPy-γ-HpI _m H _p PyH _p I _m
	2735) 5'W C A G A C G W-3'	PyPyImPyPyI _m -γ-PyI _m H _p PyH _p I _m
35	2736) 5'W C A G A C C W-3'	PyPyImPyPyPy-γ-I _m I _m H _p PyH _p I _m

TABLE 133: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2737) 5'W C A G G T T W-3'	PyPyImImHpHp-γ-PyPyPyPyHpIm
	2738) 5'W C A G G T A W-3'	PyPyImImHpPy-γ-HpPyPyPyHpIm
	2739) 5'W C A G G T G W-3'	PyPyImImHpIm-γ-PyPyPyPyHpIm
	2740) 5'W C A G G T C W-3'	PyPyImImHpPy-γ-ImPyPyPyHpIm
	2741) 5'W C A G G A T W-3'	PyPyImImPyHp-γ-PyHpPyPyHpIm
10	2742) 5'W C A G G A A W-3'	PyPyImImPyPy-γ-HpHpPyPyHpIm
	2743) 5'W C A G G A G W-3'	PyPyImImPyIm-γ-PyHpPyPyHpIm
	2744) 5'W C A G G A C W-3'	PyPyImImPyPy-γ-ImHpPyPyHpIm
	2745) 5'W C A G G G T W-3'	PyPyImImImHp-γ-PyPyPyPyHpIm
	2746) 5'W C A G G G A W-3'	PyPyImImImPy-γ-HpPyPyPyHpIm
15	2747) 5'W C A G G C T W-3'	PyPyImImPyHp-γ-PyImPyPyHpIm
	2748) 5'W C A G G C A W-3'	PyPyImImPyPy-γ-HpImPyPyHpIm
	2749) 5'W C A G C T T W-3'	PyPyImPyHpHp-γ-PyPyImPyHpIm
	2750) 5'W C A G C T A W-3'	PyPyImPyHpPy-γ-HpPyImPyHpIm
	2751) 5'W C A G C T G W-3'	PyPyImPyHpIm-γ-PyPyImPyHpIm
20	2752) 5'W C A G C T C W-3'	PyPyImPyHpPy-γ-ImPyImPyHpIm
	2753) 5'W C A G C A T W-3'	PyPyImPyPyHp-γ-PyHpImPyHpIm
	2754) 5'W C A G C A A W-3'	PyPyImPyPyPy-γ-HpHpImPyHpIm
	2755) 5'W C A G C A G W-3'	PyPyImPyPyIm-γ-PyHpImPyHpIm
	2756) 5'W C A G C A C W-3'	PyPyImPyPyPy-γ-ImHpImPyHpIm
25	2757) 5'W C A G C G T W-3'	PyPyImPyImHp-γ-PyPyImPyHpIm
	2758) 5'W C A G C G A W-3'	PyPyImPyImPy-γ-HpPyImPyHpIm
	2759) 5'W C A G C C T W-3'	PyPyImPyPyHp-γ-PyImImPyHpIm
	2760) 5'W C A G C C A W-3'	PyPyImPyPyPy-γ-HpImImPyHpIm
	2761) 5'W C A G G G G W-3'	PyPyImImImIm-γ-PyPyPyPyHpIm
30	2762) 5'W C A G G G C W-3'	PyPyImImImPy-γ-ImPyPyPyHpIm
	2763) 5'W C A G G C G W-3'	PyPyImImPyIm-γ-PyImPyPyHpIm
	2764) 5'W C A G G C C W-3'	PyPyImImPyPy-γ-ImImPyPyHpIm
	2765) 5'W C A G C G G W-3'	PyPyImPyImIm-γ-PyPyImPyHpIm
	2766) 5'W C A G C G C W-3'	PyPyImPyImPy-γ-ImPyImPyHpIm
35	2767) 5'W C A G C C G W-3'	PyPyImPyPyIm-γ-PyImImPyHpIm
	2768) 5'W C A G C C C W-3'	PyPyImPyPyPy-γ-ImImImPyHpIm

TABLE 134: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCATWNW-3'

	DNA sequence	aromatic amino acid sequence
5	2769) 5'W C A T T T T W-3'	PyPyH _p H _p H _p H _p -γ-PyPyPyPyH _p I _m
	2770) 5'W C A T T T A W-3'	PyPyH _p H _p H _p Py-γ-H _p PyPyPyH _p I _m
	2771) 5'W C A T T T G W-3'	PyPyH _p H _p H _p I _m -γ-PyPyPyPyH _p I _m
	2772) 5'W C A T T T C W-3'	PyPyH _p H _p H _p Py-γ-I _m PyPyPyH _p I _m
	2773) 5'W C A T T A T W-3'	PyPyH _p H _p PyH _p -γ-PyH _p PyPyH _p I _m
10	2774) 5'W C A T T A A W-3'	PyPyH _p H _p PyPy-γ-H _p H _p PyPyH _p I _m
	2775) 5'W C A T T A G W-3'	PyPyH _p H _p PyI _m -γ-PyH _p PyPyH _p I _m
	2776) 5'W C A T T A C W-3'	PyPyH _p H _p PyPy-γ-I _m H _p PyPyH _p I _m
	2777) 5'W C A T T G T W-3'	PyPyH _p H _p I _m H _p -γ-PyPyPyPyH _p I _m
	2778) 5'W C A T T G A W-3'	PyPyH _p H _p I _m Py-γ-H _p PyPyPyH _p I _m
15	2779) 5'W C A T T G G W-3'	PyPyH _p H _p I _m I _m -γ-PyPyPyPyH _p I _m
	2780) 5'W C A T T G C W-3'	PyPyH _p H _p I _m Py-γ-I _m PyPyPyH _p I _m
	2781) 5'W C A T T C T W-3'	PyPyH _p H _p PyH _p -γ-PyI _m PyPyH _p I _m
	2782) 5'W C A T T C A W-3'	PyPyH _p H _p PyPy-γ-H _p I _m PyPyH _p I _m
	2783) 5'W C A T T C G W-3'	PyPyH _p H _p PyI _m -γ-PyI _m PyPyH _p I _m
20	2784) 5'W C A T T C C W-3'	PyPyH _p H _p PyPy-γ-I _m I _m PyPyH _p I _m
	2785) 5'W C A T A T T W-3'	PyPyH _p PyH _p H _p -γ-PyPyH _p PyH _p I _m
	2786) 5'W C A T A T A W-3'	PyPyH _p PyH _p Py-γ-H _p PyH _p PyH _p I _m
	2787) 5'W C A T A T G W-3'	PyPyH _p PyH _p I _m -γ-PyPyH _p PyH _p I _m
	2788) 5'W C A T A T C W-3'	PyPyH _p PyH _p Py-γ-I _m PyH _p PyH _p I _m
25	2789) 5'W C A T A A T W-3'	PyPyH _p PyH _p Py-γ-PyH _p H _p PyH _p I _m
	2790) 5'W C A T A A A W-3'	PyPyH _p PyPyPy-γ-H _p H _p H _p PyH _p I _m
	2791) 5'W C A T A A G W-3'	PyPyH _p PyPyI _m -γ-PyH _p H _p PyH _p I _m
	2792) 5'W C A T A A C W-3'	PyPyH _p PyPyPy-γ-I _m H _p H _p PyH _p I _m
	2793) 5'W C A T A G T W-3'	PyPyH _p PyI _m H _p -γ-PyPyH _p PyH _p I _m
30	2794) 5'W C A T A G A W-3'	PyPyH _p PyI _m Py-γ-H _p PyH _p PyH _p I _m
	2795) 5'W C A T A G G W-3'	PyPyH _p PyI _m I _m -γ-PyPyH _p PyH _p I _m
	2796) 5'W C A T A G C W-3'	PyPyH _p PyI _m Py-γ-I _m PyH _p PyH _p I _m
	2797) 5'W C A T A C T W-3'	PyPyH _p PyPyH _p -γ-PyI _m H _p PyH _p I _m
	2798) 5'W C A T A C A W-3'	PyPyH _p PyPyPy-γ-H _p I _m H _p PyH _p I _m
35	2799) 5'W C A T A C G W-3'	PyPyH _p PyPyI _m -γ-PyI _m H _p PyH _p I _m
	2800) 5'W C A T A C C W-3'	PyPyH _p PyPyPy-γ-I _m I _m H _p PyH _p I _m

-184-

	Sequence	Sequence
5	2801) 5'W C A T G T T W-3'	PyPyHpImHpHp-γ-PyPyPyPyHpIm
	2802) 5'W C A T G T A W-3'	PyPyHpImHpPy-γ-HpPyPyPyHpIm
	2803) 5'W C A T G T G W-3'	PyPyHpImHpIm-γ-PyPyPyPyHpIm
	2804) 5'W C A T G T C W-3'	PyPyHpImHpPy-γ-ImPyPyPyHpIm
	2805) 5'W C A T G A T W-3'	PyPyHpImPyHp-γ-PyHpPyPyHpIm
10	2806) 5'W C A T G A A W-3'	PyPyHpImPyPy-γ-HpHpPyPyHpIm
	2807) 5'W C A T G A G W-3'	PyPyHpImPyIm-γ-PyHpPyPyHpIm
	2808) 5'W C A T G A C W-3'	PyPyHpImPyPy-γ-ImHpPyPyHpIm
	2809) 5'W C A T G G T W-3'	PyPyHpImImHp-γ-PyPyPyPyHpIm
	2810) 5'W C A T G G A W-3'	PyPyHpImImPy-γ-HpPyPyPyHpIm
15	2811) 5'W C A T G C T W-3'	PyPyHpImPyHp-γ-PyImPyPyHpIm
	2812) 5'W C A T G C A W-3'	PyPyHpImPyPy-γ-HpImPyPyHpIm
	2813) 5'W C A T G G G W-3'	PyPyHpImImIm-γ-PyPyPyPyHpIm
	2814) 5'W C A T G G C W-3'	PyPyHpImImPy-γ-ImPyPyPyHpIm
	2815) 5'W C A T G C G W-3'	PyPyHpImPyIm-γ-PyImPyPyHpIm
20	2816) 5'W C A T G C C W-3'	PyPyHpImPyPy-γ-ImImPyPyHpIm
	2817) 5'W C A T C T T W-3'	PyPyHpPyHpHp-γ-PyPyImPyHpIm
	2818) 5'W C A T C T A W-3'	PyPyHpPyHpPy-γ-HpPyImPyHpIm
	2819) 5'W C A T C T G W-3'	PyPyHpPyHpIm-γ-PyPyImPyHpIm
	2820) 5'W C A T C T C W-3'	PyPyHpPyHpPy-γ-ImPyImPyHpIm
25	2821) 5'W C A T C A T W-3'	PyPyHpPyPyHp-γ-PyHpImPyHpIm
	2822) 5'W C A T C A A W-3'	PyPyHpPyPyPy-γ-HpHpImPyHpIm
	2823) 5'W C A T C A G W-3'	PyPyHpPyPyIm-γ-PyHpImPyHpIm
	2824) 5'W C A T C A C W-3'	PyPyHpPyPyPy-γ-ImHpImPyHpIm
	2825) 5'W C A T C G T W-3'	PyPyHpPyImHp-γ-PyPyImPyHpIm
30	2826) 5'W C A T C G A W-3'	PyPyHpPyImPy-γ-HpPyImPyHpIm
	2827) 5'W C A T C C T W-3'	PyPyHpPyPyHp-γ-PyImImPyHpIm
	2828) 5'W C A T C C A W-3'	PyPyHpPyPyPy-γ-HpImImPyHpIm
	2829) 5'W C A T C G G W-3'	PyPyHpPyImIm-γ-PyPyImPyHpIm
	2830) 5'W C A T C G C W-3'	PyPyHpPyImPy-γ-ImPyImPyHpIm
35	2831) 5'W C A T C C G W-3'	PyPyHpPyPyIm-γ-PyImImPyHpIm
	2832) 5'W C A T C C C W-3'	PyPyHpPyPyPy-γ-ImImImPyHpIm

TABLE 136: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAA WNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2833) 5'W C A A T T T T W-3'	PyPyPyH _p H _p H _p -γ-PyPyPyH _p H _p I _m
	2834) 5'W C A A T T T A W-3'	PyPyPyH _p H _p H _p Py-γ-H _p PyPyH _p H _p I _m
	2835) 5'W C A A T T G W-3'	PyPyPyH _p H _p I _m -γ-PyPyPyH _p H _p I _m
	2836) 5'W C A A T T C W-3'	PyPyPyH _p H _p Py-γ-I _m PyPyH _p H _p I _m
	2837) 5'W C A A T A T W-3'	PyPyPyH _p PyH _p -γ-PyH _p PyH _p H _p I _m
10	2838) 5'W C A A T A A W-3'	PyPyPyH _p PyPy-γ-H _p H _p PyH _p H _p I _m
	2839) 5'W C A A T A G W-3'	PyPyPyH _p PyI _m -γ-PyH _p PyH _p H _p I _m
	2840) 5'W C A A T A C W-3'	PyPyPyH _p PyPy-γ-I _m H _p PyH _p H _p I _m
	2841) 5'W C A A T G T W-3'	PyPyPyH _p I _m H _p -γ-PyPyPyH _p H _p I _m
	2842) 5'W C A A T G A W-3'	PyPyPyH _p I _m Py-γ-H _p PyPyH _p H _p I _m
	2843) 5'W C A A T G G W-3'	PyPyPyH _p I _m I _m -γ-PyPyPyH _p H _p I _m
15	2844) 5'W C A A T G C W-3'	PyPyPyH _p I _m Py-γ-I _m PyPyH _p H _p I _m
	2845) 5'W C A A T C T W-3'	PyPyPyH _p PyH _p -γ-PyI _m PyH _p H _p I _m
	2846) 5'W C A A T C A W-3'	PyPyPyH _p PyPy-γ-H _p I _m PyH _p H _p I _m
	2847) 5'W C A A T C G W-3'	PyPyPyH _p PyI _m -γ-PyI _m PyH _p H _p I _m
	2848) 5'W C A A T C C W-3'	PyPyPyH _p PyPy-γ-I _m I _m PyH _p H _p I _m
20	2849) 5'W C A A A T T W-3'	PyPyPyPyH _p H _p -γ-PyPyH _p H _p H _p I _m
	2850) 5'W C A A A T A W-3'	PyPyPyPyH _p Py-γ-H _p PyH _p H _p H _p I _m
	2851) 5'W C A A A T G W-3'	PyPyPyPyH _p I _m -γ-PyPyH _p H _p H _p I _m
	2852) 5'W C A A A T C W-3'	PyPyPyPyH _p Py-γ-I _m PyH _p H _p H _p I _m
	2853) 5'W C A A A A T W-3'	PyPyPyPyH _p Py-γ-PyH _p H _p H _p H _p I _m
25	2854) 5'W C A A A A A W-3'	PyPyPyPyPyH _p H _p H _p H _p I _m
	2855) 5'W C A A A A G W-3'	PyPyPyPyPyI _m -γ-PyH _p H _p H _p H _p I _m
	2856) 5'W C A A A A C W-3'	PyPyPyPyPyPy-γ-I _m H _p H _p H _p H _p I _m
	2857) 5'W C A A A A G T W-3'	PyPyPyPyPyI _m H _p -γ-PyPyH _p H _p H _p I _m
	2858) 5'W C A A A A G A W-3'	PyPyPyPyPyI _m Py-γ-H _p PyH _p H _p H _p I _m
30	2859) 5'W C A A A G G W-3'	PyPyPyPyPyI _m I _m -γ-PyPyH _p H _p H _p H _p I _m
	2860) 5'W C A A A G C W-3'	PyPyPyPyPyI _m Py-γ-I _m PyH _p H _p H _p H _p I _m
	2861) 5'W C A A A C T W-3'	PyPyPyPyPyH _p -γ-PyI _m H _p H _p H _p H _p I _m
	2862) 5'W C A A A C A W-3'	PyPyPyPyPyPy-γ-H _p I _m H _p H _p H _p H _p I _m
	2863) 5'W C A A A C G W-3'	PyPyPyPyPyI _m -γ-PyI _m H _p H _p H _p H _p I _m
35	2864) 5'W C A A A C C W-3'	PyPyPyPyPyPy-γ-I _m I _m H _p H _p H _p H _p I _m

TABLE 137: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCAASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2865) 5'W C A A G T T W-3'	PyPyPyImHpHp-γ-PyPyPyHpHpIm
	2866) 5'W C A A G T A W-3'	PyPyPyImHpPy-γ-HpPyPyHpHpIm
	2867) 5'W C A A G T G W-3'	PyPyPyImHpIm-γ-PyPyPyHpHpIm
	2868) 5'W C A A G T C W-3'	PyPyPyImHpPy-γ-ImPyPyHpHpIm
	2869) 5'W C A A G A T W-3'	PyPyPyImPyHp-γ-PyHpPyHpHpIm
10	2870) 5'W C A A G A A W-3'	PyPyPyImPyPy-γ-HpHpPyHpHpIm
	2871) 5'W C A A G A G W-3'	PyPyPyImPyIm-γ-PyHpPyHpHpIm
	2872) 5'W C A A G A C W-3'	PyPyPyImPyPy-γ-ImHpPyHpHpIm
	2873) 5'W C A A G G T W-3'	PyPyPyImImHp-γ-PyPyPyHpHpIm
	2874) 5'W C A A G G A W-3'	PyPyPyImImPy-γ-HpPyPyHpHpIm
15	2875) 5'W C A A G C T W-3'	PyPyPyImPyHp-γ-PyImPyHpHpIm
	2876) 5'W C A A G C A W-3'	PyPyPyImPyPy-γ-HpImPyHpHpIm
	2877) 5'W C A A G G G W-3'	PyPyPyImImIm-γ-PyPyPyHpHpIm
	2878) 5'W C A A G G C W-3'	PyPyPyImImPy-γ-ImPyPyHpHpIm
	2879) 5'W C A A G C G W-3'	PyPyPyImPyIm-γ-PyImPyHpHpIm
20	2880) 5'W C A A G C C W-3'	PyPyPyImPyPy-γ-ImImPyHpHpIm
	2881) 5'W C A A C T T W-3'	PyPyPyPyHpHp-γ-PyPyImHpHpIm
	2882) 5'W C A A C T A W-3'	PyPyPyPyHpPy-γ-HpPyImHpHpIm
	2883) 5'W C A A C T G W-3'	PyPyPyPyHpIm-γ-PyPyImHpHpIm
	2884) 5'W C A A C T C W-3'	PyPyPyPyHpPy-γ-ImPyImHpHpIm
25	2885) 5'W C A A C A T W-3'	PyPyPyPyHp-γ-PyHpImHpHpIm
	2886) 5'W C A A C A A W-3'	PyPyPyPyPyPy-γ-HpHpImHpHpIm
	2887) 5'W C A A C A G W-3'	PyPyPyPyPyIm-γ-PyHpImHpHpIm
	2888) 5'W C A A C A C W-3'	PyPyPyPyPyPy-γ-ImHpImHpHpIm
	2889) 5'W C A A C G T W-3'	PyPyPyPyImHp-γ-PyPyImHpHpIm
30	2890) 5'W C A A C G A W-3'	PyPyPyPyImPy-γ-HpPyImHpHpIm
	2891) 5'W C A A C C T W-3'	PyPyPyPyPyHp-γ-PyImImHpHpIm
	2892) 5'W C A A C C A W-3'	PyPyPyPyPyPy-γ-HpImImHpHpIm
	2893) 5'W C A A C G G W-3'	PyPyPyPyImIm-γ-PyPyImHpHpIm
	2894) 5'W C A A C G C W-3'	PyPyPyPyImPy-γ-ImPyImHpHpIm
35	2895) 5'W C A A C C G W-3'	PyPyPyPyPyIm-γ-PyImImHpHpIm
	2896) 5'W C A A C C C W-3'	PyPyPyPyPyPy-γ-ImImImHpHpIm

TABLE 138: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCACWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2897) 5'W C A C T T T W-3'	PyPyPyHpheHpe- γ -PyPyPyImHpeIm
	2898) 5'W C A C T T A W-3'	PyPyPyHpheHpePy- γ -HpePyPyImHpeIm
	2899) 5'W C A C T T G W-3'	PyPyPyHpheHpeIm- γ -PyPyPyImHpeIm
	2900) 5'W C A C T T C W-3'	PyPyPyHpheHpePy- γ -ImPyPyImHpeIm
	2901) 5'W C A C T A T W-3'	PyPyPyHpheHpePy- γ -HpePyPyImHpeIm
10	2902) 5'W C A C T A A W-3'	PyPyPyHpheHpePy- γ -HpeHpePyImHpeIm
	2903) 5'W C A C T A G W-3'	PyPyPyHpheHpePyIm- γ -HpePyPyImHpeIm
	2904) 5'W C A C T A C W-3'	PyPyPyHpheHpePy- γ -ImHpePyImHpeIm
	2905) 5'W C A C T G T W-3'	PyPyPyHpheHpeIm- γ -PyPyPyImHpeIm
	2906) 5'W C A C T G A W-3'	PyPyPyHpheHpeImPy- γ -HpePyPyImHpeIm
	2907) 5'W C A C T G G W-3'	PyPyPyHpheHpeIm- γ -PyPyPyPyImHpeIm
15	2908) 5'W C A C T G C W-3'	PyPyPyHpheHpeImPy- γ -ImPyPyImHpeIm
	2909) 5'W C A C T C T W-3'	PyPyPyHpheHpePy- γ -PyImPyImHpeIm
	2910) 5'W C A C T C A W-3'	PyPyPyHpheHpePy- γ -HpeImPyImHpeIm
	2911) 5'W C A C T C G W-3'	PyPyPyHpheHpePyIm- γ -PyImPyImHpeIm
	2912) 5'W C A C T C C W-3'	PyPyPyHpheHpePy- γ -ImImPyImHpeIm
20	2913) 5'W C A C A T T W-3'	PyPyPyPyHphe- γ -PyPyHpeImHpeIm
	2914) 5'W C A C A T A W-3'	PyPyPyPyHphePy- γ -HpePyHpeImHpeIm
	2915) 5'W C A C A T G W-3'	PyPyPyPyHpheIm- γ -PyPyHpeImHpeIm
	2916) 5'W C A C A T C W-3'	PyPyPyPyHphePy- γ -ImPyHpeImHpeIm
	2917) 5'W C A C A A T W-3'	PyPyPyPyHphePy- γ -HpeHpeImHpeIm
25	2918) 5'W C A C A A A W-3'	PyPyPyPyPyHphe- γ -HpeHpeHpeImHpeIm
	2919) 5'W C A C A A G W-3'	PyPyPyPyPyHpheIm- γ -HpeHpeHpeImHpeIm
	2920) 5'W C A C A A C W-3'	PyPyPyPyPyHphePy- γ -ImHpeHpeImHpeIm
	2921) 5'W C A C A G T W-3'	PyPyPyPyPyHphe- γ -PyPyHpeImHpeIm
	2922) 5'W C A C A G A W-3'	PyPyPyPyPyHphe- γ -HpePyHpeImHpeIm
30	2923) 5'W C A C A G G W-3'	PyPyPyPyPyHpheIm- γ -PyPyHpeImHpeIm
	2924) 5'W C A C A G C W-3'	PyPyPyPyPyHpheImPy- γ -ImPyHpeImHpeIm
	2925) 5'W C A C A C T W-3'	PyPyPyPyPyHphe- γ -PyImHpeImHpeIm
	2926) 5'W C A C A C A W-3'	PyPyPyPyPyHphe- γ -HpeImHpeImHpeIm
	2927) 5'W C A C A C G W-3'	PyPyPyPyPyHphe- γ -PyImHpeImHpeIm
35	2928) 5'W C A C A C C W-3'	PyPyPyPyPyHphe- γ -ImImHpeImHpeIm

TABLE 139: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCACSNW-3'

	DNA sequence	aromatic amino acid sequence
5	2929) 5'W C A C G T T W-3'	PyPyPyImHpHp-γ-PyPyPyImHpIm
	2930) 5'W C A C G T A W-3'	PyPyPyImHpPy-γ-HpPyPyImHpIm
	2931) 5'W C A C G T G W-3'	PyPyPyImHpIm-γ-PyPyPyImHpIm
	2932) 5'W C A C G T C W-3'	PyPyPyImHpPy-γ-ImPyPyImHpIm
	2933) 5'W C A C G A T W-3'	PyPyPyImPyHp-γ-PyHpPyImHpIm
10	2934) 5'W C A C G A A W-3'	PyPyPyImPyPy-γ-HpHpPyImHpIm
	2935) 5'W C A C G A G W-3'	PyPyPyImPyIm-γ-PyHpPyImHpIm
	2936) 5'W C A C G A C W-3'	PyPyPyImPyPy-γ-ImHpPyImHpIm
	2937) 5'W C A C G G T W-3'	PyPyPyImImHp-γ-PyPyPyImHpIm
	2938) 5'W C A C G G A W-3'	PyPyPyImImPy-γ-HpPyPyImHpIm
15	2939) 5'W C A C G C T W-3'	PyPyPyImPyHp-γ-PyImPyImHpIm
	2940) 5'W C A C G C A W-3'	PyPyPyImPyPy-γ-HpImPyImHpIm
	2941) 5'W C A C C T T W-3'	PyPyPyPyHpHp-γ-PyPyImImHpIm
	2942) 5'W C A C C T A W-3'	PyPyPyPyHpPy-γ-HpPyImImHpIm
	2943) 5'W C A C C T G W-3'	PyPyPyPyHpIm-γ-PyPyImImHpIm
20	2944) 5'W C A C C T C W-3'	PyPyPyPyHpPy-γ-ImPyImImHpIm
	2945) 5'W C A C C A T W-3'	PyPyPyPyPyHp-γ-PyHpImImHpIm
	2946) 5'W C A C C A A W-3'	PyPyPyPyPyPy-γ-HpHpImImHpIm
	2947) 5'W C A C C A G W-3'	PyPyPyPyPyIm-γ-PyHpImImHpIm
	2948) 5'W C A C C A C W-3'	PyPyPyPyPyPy-γ-ImHpImImHpIm
25	2949) 5'W C A C C G T W-3'	PyPyPyPyPyImHp-γ-PyPyImImHpIm
	2950) 5'W C A C C G A W-3'	PyPyPyPyPyImPy-γ-HpPyImImHpIm
	2951) 5'W C A C C C T W-3'	PyPyPyPyPyHp-γ-PyImImImHpIm
	2952) 5'W C A C C C A W-3'	PyPyPyPyPyPy-γ-HpImImImHpIm
	2953) 5'W C A C G G G W-3'	PyPyPyImImIm-γ-PyPyPyImHpIm
30	2954) 5'W C A C G G C W-3'	PyPyPyImImPy-γ-ImPyPyImHpIm
	2955) 5'W C A C G C G W-3'	PyPyPyImPyIm-γ-PyImPyImHpIm
	2956) 5'W C A C G C C W-3'	PyPyPyImPyPy-γ-ImImPyImHpIm
	2957) 5'W C A C C G G W-3'	PyPyPyPyImIm-γ-PyPyImImHpIm
	2958) 5'W C A C C G C W-3'	PyPyPyPyImPy-γ-ImPyImImHpIm
35	2959) 5'W C A C C C G W-3'	PyPyPyPyPyIm-γ-PyImImImHpIm
	2960) 5'W C A C C C C W-3'	PyPyPyPyPyPy-γ-ImImImImHpIm

TABLE 140: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTGWNW-3'

	DNA sequence	aromatic amino acid sequence
5	2961) 5'W C T G T T T W-3'	PyHpImHpHpH _p -γ-PyPyPyPyPyIm
	2962) 5'W C T G T T A W-3'	PyHpImHpHpPy-γ-HpPyPyPyPyIm
	2963) 5'W C T G T T G W-3'	PyHpImHpHpIm-γ-PyPyPyPyPyIm
	2964) 5'W C T G T T C W-3'	PyHpImHpHpPy-γ-ImPyPyPyPyIm
	2965) 5'W C T G T A T W-3'	PyHpImHpPyH _p -γ-PyHpPyPyPyIm
10	2966) 5'W C T G T A A W-3'	PyHpImHpPyPy-γ-HpHpPyPyPyIm
	2967) 5'W C T G T A G W-3'	PyHpImHpPyIm-γ-PyHpPyPyPyIm
	2968) 5'W C T G T A C W-3'	PyHpImHpPyPy-γ-ImHpPyPyPyIm
	2969) 5'W C T G T G T W-3'	PyHpImHpImHp-γ-PyPyPyPyPyIm
	2970) 5'W C T G T G A W-3'	PyHpImHpImPy-γ-HpPyPyPyPyIm
	2971) 5'W C T G T G G W-3'	PyHpImHpImIm-γ-PyPyPyPyPyIm
15	2972) 5'W C T G T G C W-3'	PyHpImHpImPy-γ-ImPyPyPyPyIm
	2973) 5'W C T G T C T W-3'	PyHpImHpPyH _p -γ-PyImPyPyPyIm
	2974) 5'W C T G T C A W-3'	PyHpImHpPyPy-γ-HpImPyPyPyIm
	2975) 5'W C T G T C G W-3'	PyHpImHpPyIm-γ-PyImPyPyPyIm
	2976) 5'W C T G T C C W-3'	PyHpImHpPyPy-γ-ImImPyPyPyIm
20	2977) 5'W C T G A T T W-3'	PyHpImPyH _p H _p -γ-PyPyH _p PyPyIm
	2978) 5'W C T G A T A W-3'	PyHpImPyH _p Py-γ-HpPyH _p PyPyIm
	2979) 5'W C T G A T G W-3'	PyHpImPyH _p Im-γ-PyPyH _p PyPyIm
	2980) 5'W C T G A T C W-3'	PyHpImPyH _p Py-γ-ImPyH _p PyPyIm
	2981) 5'W C T G A A T W-3'	PyHpImPyH _p -γ-PyH _p H _p PyPyIm
25	2982) 5'W C T G A A A W-3'	PyHpImPyPyPy-γ-HpH _p H _p PyPyIm
	2983) 5'W C T G A A G W-3'	PyHpImPyPyIm-γ-PyH _p H _p PyPyIm
	2984) 5'W C T G A A C W-3'	PyHpImPyPyPy-γ-ImH _p H _p PyPyIm
	2985) 5'W C T G A G T W-3'	PyHpImPyImHp-γ-PyPyH _p PyPyIm
	2986) 5'W C T G A G A W-3'	PyHpImPyImPy-γ-HpPyH _p PyPyIm
30	2987) 5'W C T G A G G W-3'	PyHpImPyImIm-γ-PyPyH _p PyPyIm
	2988) 5'W C T G A G C W-3'	PyHpImPyImPy-γ-ImPyH _p PyPyIm
	2989) 5'W C T G A C T W-3'	PyHpImPyPyH _p -γ-PyImH _p PyPyIm
	2990) 5'W C T G A C A W-3'	PyHpImPyPyPy-γ-HpImH _p PyPyIm
	2991) 5'W C T G A C G W-3'	PyHpImPyPyIm-γ-PyImH _p PyPyIm
35	2992) 5'W C T G A C C W-3'	PyHpImPyPyPy-γ-ImImH _p PyPyIm

TABLE 141: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2993) 5'W C T G G T T W-3'	PyHpImImHpHp-γ-PyPyPyPyPyIm
	2994) 5'W C T G G T A W-3'	PyHpImImHpPy-γ-HpPyPyPyPyIm
	2995) 5'W C T G G T G W-3'	PyHpImImHpIm-γ-PyPyPyPyPyIm
	2996) 5'W C T G G T C W-3'	PyHpImImHpPy-γ-ImPyPyPyPyIm
	2997) 5'W C T G G A T W-3'	PyHpImImPyHp-γ-PyHpPyPyPyIm
10	2998) 5'W C T G G A A W-3'	PyHpImImPyPy-γ-HpHpPyPyPyIm
	2999) 5'W C T G G A G W-3'	PyHpImImPyIm-γ-PyHpPyPyPyIm
	3000) 5'W C T G G A C W-3'	PyHpImImPyPy-γ-ImHpPyPyPyIm
	3001) 5'W C T G G G T W-3'	PyHpImImImHp-γ-PyPyPyPyPyIm
	3002) 5'W C T G G G A W-3'	PyHpImImImPy-γ-HpPyPyPyPyIm
15	3003) 5'W C T G G C T W-3'	PyHpImImPyHp-γ-PyImPyPyPyIm
	3004) 5'W C T G G C A W-3'	PyHpImImPyPy-γ-HpImPyPyPyIm
	3005) 5'W C T G C T T W-3'	PyHpImPyHpHp-γ-PyPyImPyPyIm
	3006) 5'W C T G C T A W-3'	PyHpImPyHpPy-γ-HpPyImPyPyIm
	3007) 5'W C T G C T G W-3'	PyHpImPyHpIm-γ-PyPyImPyPyIm
20	3008) 5'W C T G C T C W-3'	PyHpImPyHpPy-γ-ImPyImPyPyIm
	3009) 5'W C T G C A T W-3'	PyHpImPyPyHp-γ-PyHpImPyPyIm
	3010) 5'W C T G C A A W-3'	PyHpImPyPyPy-γ-HpHpImPyPyIm
	3011) 5'W C T G C A G W-3'	PyHpImPyPyIm-γ-PyHpImPyPyIm
	3012) 5'W C T G C A C W-3'	PyHpImPyPyPy-γ-ImHpImPyPyIm
25	3013) 5'W C T G C G T W-3'	PyHpImPyImHp-γ-PyPyImPyPyIm
	3014) 5'W C T G C G A W-3'	PyHpImPyImPy-γ-HpPyImPyPyIm
	3015) 5'W C T G C C T W-3'	PyHpImPyPyHp-γ-PyImImPyPyIm
	3016) 5'W C T G C C A W-3'	PyHpImPyPyPy-γ-HpImImPyPyIm
	3017) 5'W C T G G G G W-3'	PyHpImImImIm-γ-PyPyPyPyPyIm
30	3018) 5'W C T G G G C W-3'	PyHpImImImPy-γ-ImPyPyPyPyIm
	3019) 5'W C T G G C G W-3'	PyHpImImPyIm-γ-PyImPyPyPyIm
	3020) 5'W C T G G C C W-3'	PyHpImImPyPy-γ-ImImPyPyPyIm
	3021) 5'W C T G C G G W-3'	PyHpImPyImIm-γ-PyPyImPyPyIm
	3022) 5'W C T G C G C W-3'	PyHpImPyImPy-γ-ImPyImPyPyIm
35	3023) 5'W C T G C C G W-3'	PyHpImPyPyIm-γ-PyImImPyPyIm
	3024) 5'W C T G C C C W-3'	PyHpImPyPyPy-γ-ImImImPyPyIm

TABLE 142: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCCTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	3025) 5'W C T T T T T W-3'	PyH _p H _p H _p H _p H _p -γ-PyPyPyPyPyIm
	3026) 5'W C T T T T A W-3'	PyH _p H _p H _p H _p Py-γ-HpPyPyPyPyIm
	3027) 5'W C T T T T G W-3'	PyH _p H _p H _p H _p Im-γ-PyPyPyPyPyIm
	3028) 5'W C T T T T C W-3'	PyH _p H _p H _p H _p Py-γ-ImPyPyPyPyIm
	3029) 5'W C T T T A T W-3'	PyH _p H _p H _p PyH _p -γ-PyH _p PyPyPyIm
	3030) 5'W C T T T A A W-3'	PyH _p H _p H _p PyPy-γ-HpH _p PyPyPyIm
10	3031) 5'W C T T T A G W-3'	PyH _p H _p H _p PyIm-γ-PyH _p PyPyPyIm
	3032) 5'W C T T T A C W-3'	PyH _p H _p H _p PyPy-γ-ImH _p PyPyPyIm
	3033) 5'W C T T T G T W-3'	PyH _p H _p H _p ImH _p -γ-PyPyPyPyPyIm
	3034) 5'W C T T T G A W-3'	PyH _p H _p H _p ImPy-γ-HpPyPyPyPyIm
	3035) 5'W C T T T G G W-3'	PyH _p H _p H _p ImIm-γ-PyPyPyPyPyIm
15	3036) 5'W C T T T G C W-3'	PyH _p H _p H _p ImPy-γ-ImPyPyPyPyIm
	3037) 5'W C T T T C T W-3'	PyH _p H _p H _p PyH _p -γ-PyImPyPyPyIm
	3038) 5'W C T T T C A W-3'	PyH _p H _p H _p PyPy-γ-HpImPyPyPyIm
	3039) 5'W C T T T C G W-3'	PyH _p H _p H _p PyIm-γ-PyImPyPyPyIm
	3040) 5'W C T T T C C W-3'	PyH _p H _p H _p PyPy-γ-ImImPyPyPyIm
20	3041) 5'W C T T A T T W-3'	PyH _p H _p PyH _p H _p -γ-PyPyH _p PyPyIm
	3042) 5'W C T T A T A W-3'	PyH _p H _p PyH _p Py-γ-HpPyH _p PyPyIm
	3043) 5'W C T T A T G W-3'	PyH _p H _p PyH _p Im-γ-PyPyH _p PyPyIm
	3044) 5'W C T T A T C W-3'	PyH _p H _p PyH _p Py-γ-ImPyH _p PyPyIm
	3045) 5'W C T T A A T W-3'	PyH _p H _p PyH _p -γ-PyH _p H _p PyPyIm
25	3046) 5'W C T T A A A W-3'	PyH _p H _p PyPyPy-γ-HpH _p H _p PyPyIm
	3047) 5'W C T T A A G W-3'	PyH _p H _p PyPyIm-γ-PyH _p H _p PyPyIm
	3048) 5'W C T T A A C W-3'	PyH _p H _p PyPyPy-γ-ImH _p H _p PyPyIm
	3049) 5'W C T T A G T W-3'	PyH _p H _p PyImH _p -γ-PyPyH _p PyPyIm
	3050) 5'W C T T A G A W-3'	PyH _p H _p PyImPy-γ-HpPyH _p PyPyIm
30	3051) 5'W C T T A G G W-3'	PyH _p H _p PyImIm-γ-PyPyH _p PyPyIm
	3052) 5'W C T T A G C W-3'	PyH _p H _p PyImPy-γ-ImPyH _p PyPyIm
	3053) 5'W C T T A C T W-3'	PyH _p H _p PyPyH _p -γ-PyImH _p PyPyIm
	3054) 5'W C T T A C A W-3'	PyH _p H _p PyPyPy-γ-HpImH _p PyPyIm
	3055) 5'W C T T A C G W-3'	PyH _p H _p PyPyIm-γ-PyImH _p PyPyIm
35	3056) 5'W C T T A C C W-3'	PyH _p H _p PyPyPy-γ-ImImH _p PyPyIm

TABLE 143: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	3057) 5'W C T T G T T W-3'	PyHpHpImHpHp-γ-PyPyPyPyPyIm
	3058) 5'W C T T G T A W-3'	PyHpHpImHpPy-γ-HpPyPyPyPyIm
	3059) 5'W C T T G T G W-3'	PyHpHpImHpIm-γ-PyPyPyPyPyIm
	3060) 5'W C T T G T C W-3'	PyHpHpImHpPy-γ-ImPyPyPyPyIm
	3061) 5'W C T T G A T W-3'	PyHpHpImPyHp-γ-PyHpPyPyPyIm
	3062) 5'W C T T G A A W-3'	PyHpHpImPyPy-γ-HpHpPyPyPyIm
10	3063) 5'W C T T G A G W-3'	PyHpHpImPyIm-γ-PyHpPyPyPyIm
	3064) 5'W C T T G A C W-3'	PyHpHpImPyPy-γ-ImHpPyPyPyIm
	3065) 5'W C T T G G T W-3'	PyHpHpImImHp-γ-PyPyPyPyPyIm
	3066) 5'W C T T G G A W-3'	PyHpHpImImPy-γ-HpPyPyPyPyIm
	3067) 5'W C T T G C T W-3'	PyHpHpImPyHp-γ-PyImPyPyPyIm
15	3068) 5'W C T T G C A W-3'	PyHpHpImPyPy-γ-HpImPyPyPyIm
	3069) 5'W C T T G G G W-3'	PyHpHpImImIm-γ-PyPyPyPyPyIm
	3070) 5'W C T T G G C W-3'	PyHpHpImImPy-γ-ImPyPyPyPyIm
	3071) 5'W C T T G C G W-3'	PyHpHpImPyIm-γ-PyImPyPyPyIm
	3072) 5'W C T T G C C W-3'	PyHpHpImPyPy-γ-ImImPyPyPyIm
20	3073) 5'W C T T C T T W-3'	PyHpHpPyHpHp-γ-PyPyImPyPyIm
	3074) 5'W C T T C T A W-3'	PyHpHpPyHpPy-γ-HpPyImPyPyIm
	3075) 5'W C T T C T G W-3'	PyHpHpPyHpIm-γ-PyPyImPyPyIm
	3076) 5'W C T T C T C W-3'	PyHpHpPyHpPy-γ-ImPyImPyPyIm
	3077) 5'W C T T C A T W-3'	PyHpHpPyHp-γ-PyHpiPyPyIm
25	3078) 5'W C T T C A A W-3'	PyHpHpPyPyPy-γ-HpHpImPyPyIm
	3079) 5'W C T T C A G W-3'	PyHpHpPyPyIm-γ-PyHpiPyPyIm
	3080) 5'W C T T C A C W-3'	PyHpHpPyPyPy-γ-ImHpImPyPyIm
	3081) 5'W C T T C G T W-3'	PyHpHpPyImHp-γ-PyPyImPyPyIm
	3082) 5'W C T T C G A W-3'	PyHpHpPyImPy-γ-HpPyImPyPyIm
30	3083) 5'W C T T C C T W-3'	PyHpHpPyPyHp-γ-PyImImPyPyIm
	3084) 5'W C T T C C A W-3'	PyHpHpPyPyPy-γ-HpImImPyPyIm
	3085) 5'W C T T C G G W-3'	PyHpHpPyImIm-γ-PyPyImPyPyIm
	3086) 5'W C T T C G C W-3'	PyHpHpPyImPy-γ-ImPyImPyPyIm
	3087) 5'W C T T C C G W-3'	PyHpHpPyPyIm-γ-PyImImPyPyIm
35	3088) 5'W C T T C C C W-3'	PyHpHpPyPyPy-γ-ImImImPyPyIm

TABLE 144: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	3089) 5'W C T A T T T W-3'	PyHpPyHpHpH _p -γ-PyPyPyHpPyIm
	3090) 5'W C T A T T A W-3'	PyHpPyHpHpPy-γ-HpPyPyHpPyIm
	3091) 5'W C T A T T G W-3'	PyHpPyHpHpIm-γ-PyPyPyHpPyIm
	3092) 5'W C T A T T C W-3'	PyHpPyHpHpPy-γ-ImPyPyHpPyIm
	3093) 5'W C T A T A T W-3'	PyHpPyHpPyHp-γ-PyHpPyHpPyIm
10	3094) 5'W C T A T A A W-3'	PyHpPyHpPyPy-γ-HpHpPyHpPyIm
	3095) 5'W C T A T A G W-3'	PyHpPyHpPyIm-γ-PyHpPyHpPyIm
	3096) 5'W C T A T A C W-3'	PyHpPyHpPyPy-γ-ImH _p PyHpPyIm
	3097) 5'W C T A T G T W-3'	PyHpPyHpImH _p -γ-PyPyPyHpPyIm
	3098) 5'W C T A T G A W-3'	PyHpPyHpImPy-γ-HpPyPyHpPyIm
15	3099) 5'W C T A T G G W-3'	PyHpPyHpImIm-γ-PyPyPyHpPyIm
	3100) 5'W C T A T G C W-3'	PyHpPyHpImPy-γ-ImPyPyHpPyIm
	3101) 5'W C T A T C T W-3'	PyHpPyHpPyHp-γ-PyImPyHpPyIm
	3102) 5'W C T A T C A W-3'	PyHpPyHpPyPy-γ-HpImPyHpPyIm
	3103) 5'W C T A T C G W-3'	PyHpPyHpPyIm-γ-PyImPyHpPyIm
20	3104) 5'W C T A T C C W-3'	PyHpPyHpPyPy-γ-ImImPyHpPyIm
	3105) 5'W C T A A T T W-3'	PyHpPyPyHpH _p -γ-PyPyHpPyIm
	3106) 5'W C T A A T A W-3'	PyHpPyPyHpPy-γ-HpPyHpH _p PyIm
	3107) 5'W C T A A T G W-3'	PyHpPyPyHpIm-γ-PyPyHpH _p PyIm
	3108) 5'W C T A A T C W-3'	PyHpPyPyHpPy-γ-ImPyHpH _p PyIm
	3109) 5'W C T A A A T W-3'	PyHpPyPyHp-γ-PyHpH _p PyIm
25	3110) 5'W C T A A A A W-3'	PyHpPyPyPyPy-γ-HpH _p H _p PyIm
	3111) 5'W C T A A A G W-3'	PyHpPyPyPyIm-γ-PyHpH _p PyIm
	3112) 5'W C T A A A C W-3'	PyHpPyPyPyPy-γ-ImH _p H _p PyIm
	3113) 5'W C T A A A G T W-3'	PyHpPyPyImH _p -γ-PyPyHpH _p PyIm
	3114) 5'W C T A A A G A W-3'	PyHpPyPyImPy-γ-HpPyHpH _p PyIm
30	3115) 5'W C T A A G G W-3'	PyHpPyPyImIm-γ-PyPyHpH _p PyIm
	3116) 5'W C T A A A G C W-3'	PyHpPyPyImPy-γ-ImPyHpH _p PyIm
	3117) 5'W C T A A A C T W-3'	PyHpPyPyPyH _p -γ-PyImH _p H _p PyIm
	3118) 5'W C T A A A C A W-3'	PyHpPyPyPyPy-γ-HpImH _p H _p PyIm
	3119) 5'W C T A A A C G W-3'	PyHpPyPyPyIm-γ-PyImH _p H _p PyIm
35	3120) 5'W C T A A A C C W-3'	PyHpPyPyPyPy-γ-ImImH _p H _p PyIm

TABLE 145: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	3121) 5'W C T A G T T W-3'	PyHpPyImHpH _p -γ-PyPyPyH _p PyIm
	3122) 5'W C T A G T A W-3'	PyHpPyImHpPy-γ-HpPyPyH _p PyIm
	3123) 5'W C T A G T G W-3'	PyHpPyImHpIm-γ-PyPyPyH _p PyIm
	3124) 5'W C T A G T C W-3'	PyHpPyImHpPy-γ-ImPyPyH _p PyIm
	3125) 5'W C T A G A T W-3'	PyHpPyImPyH _p -γ-PyH _p PyH _p PyIm
10	3126) 5'W C T A G A A W-3'	PyHpPyImPyPy-γ-HpH _p PyH _p PyIm
	3127) 5'W C T A G A G W-3'	PyHpPyImPyIm-γ-PyH _p PyH _p PyIm
	3128) 5'W C T A G A C W-3'	PyHpPyImPyPy-γ-ImH _p PyH _p PyIm
	3129) 5'W C T A G G T W-3'	PyHpPyImImH _p -γ-PyPyPyH _p PyIm
	3130) 5'W C T A G G A W-3'	PyHpPyImImPy-γ-HpPyPyH _p PyIm
15	3131) 5'W C T A G C T W-3'	PyHpPyImPyH _p -γ-PyImPyH _p PyIm
	3132) 5'W C T A G C A W-3'	PyHpPyImPyPy-γ-HpImPyH _p PyIm
	3133) 5'W C T A G G G W-3'	PyHpPyImImIm-γ-PyPyPyH _p PyIm
	3134) 5'W C T A G G C W-3'	PyHpPyImImPy-γ-ImPyPyH _p PyIm
	3135) 5'W C T A G C G W-3'	PyHpPyImPyIm-γ-PyImPyH _p PyIm
20	3136) 5'W C T A G C C W-3'	PyHpPyImPyPy-γ-ImImPyH _p PyIm
	3137) 5'W C T A C T T W-3'	PyHpPyPyH _p H _p -γ-PyPyImH _p PyIm
	3138) 5'W C T A C T A W-3'	PyHpPyPyH _p Py-γ-HpPyImH _p PyIm
	3139) 5'W C T A C T G W-3'	PyHpPyPyH _p Im-γ-PyPyImH _p PyIm
	3140) 5'W C T A C T C W-3'	PyHpPyPyH _p Py-γ-ImPyImH _p PyIm
25	3141) 5'W C T A C A T W-3'	PyHpPyPyH _p Py-γ-PyH _p ImH _p PyIm
	3142) 5'W C T A C A A W-3'	PyHpPyPyPyH _p Py-γ-HpH _p ImH _p PyIm
	3143) 5'W C T A C A G W-3'	PyHpPyPyPyH _p Im-γ-PyH _p ImH _p PyIm
	3144) 5'W C T A C A C W-3'	PyHpPyPyPyH _p Py-γ-ImH _p ImH _p PyIm
	3145) 5'W C T A C G T W-3'	PyHpPyPyImH _p -γ-PyPyImH _p PyIm
30	3146) 5'W C T A C G A W-3'	PyHpPyPyImPy-γ-HpPyImH _p PyIm
	3147) 5'W C T A C C T W-3'	PyHpPyPyPyH _p Py-γ-PyImImH _p PyIm
	3148) 5'W C T A C C A W-3'	PyHpPyPyPyH _p Py-γ-HpImImH _p PyIm
	3149) 5'W C T A C G G W-3'	PyHpPyPyImIm-γ-PyPyImH _p PyIm
	3150) 5'W C T A C G C W-3'	PyHpPyPyImPy-γ-ImPyImH _p PyIm
35	3151) 5'W C T A C C G W-3'	PyHpPyPyIm-γ-PyImImH _p PyIm
	3152) 5'W C T A C C C W-3'	PyHpPyPyPyPy-γ-ImImImH _p PyIm

TABLE 146: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTCWNNW-3'

	DNA sequence	aromatic amino acid sequence
	3153) 5'W C T C T T T W-3'	PyHpPyHpHpH _p -γ-PyPyPyImPyIm
5	3154) 5'W C T C T T A W-3'	PyHpPyHpHpPy-γ-HpPyPyImPyIm
	3155) 5'W C T C T T G W-3'	PyHpPyHpHpIm-γ-PyPyPyImPyIm
	3156) 5'W C T C T T C W-3'	PyHpPyHpHpPy-γ-ImPyPyImPyIm
	3157) 5'W C T C T A T W-3'	PyHpPyHpPyH _p -γ-PyHpPyImPyIm
	3158) 5'W C T C T A A W-3'	PyHpPyHpPyPy-γ-HpHpPyImPyIm
10	3159) 5'W C T C T A G W-3'	PyHpPyHpPyIm-γ-PyHpPyImPyIm
	3160) 5'W C T C T A C W-3'	PyHpPyHpPyPy-γ-ImH _p PyImPyIm
	3161) 5'W C T C T G T W-3'	PyHpPyHpImH _p -γ-PyPyPyImPyIm
	3162) 5'W C T C T G A W-3'	PyHpPyHpImPy-γ-HpPyPyImPyIm
	3163) 5'W C T C T G G W-3'	PyHpPyHpImIm-γ-PyPyPyImPyIm
15	3164) 5'W C T C T G C W-3'	PyHpPyHpImPy-γ-ImPyPyImPyIm
	3165) 5'W C T C T C T W-3'	PyHpPyHpPyH _p -γ-PyImPyImPyIm
	3166) 5'W C T C T C A W-3'	PyHpPyHpPyPy-γ-HpImPyImPyIm
	3167) 5'W C T C T C G W-3'	PyHpPyHpPyIm-γ-PyImPyImPyIm
	3168) 5'W C T C T C C W-3'	PyHpPyHpPyPy-γ-ImImPyImPyIm
20	3169) 5'W C T C A T T W-3'	PyHpPyPyH _p H _p -γ-PyPyH _p ImPyIm
	3170) 5'W C T C A T A W-3'	PyHpPyPyH _p Py-γ-HpPyH _p ImPyIm
	3171) 5'W C T C A T G W-3'	PyHpPyPyH _p Im-γ-PyPyH _p ImPyIm
	3172) 5'W C T C A T C W-3'	PyHpPyPyH _p Py-γ-ImPyH _p ImPyIm
	3173) 5'W C T C A A T W-3'	PyHpPyPyH _p -γ-PyH _p H _p ImPyIm
25	3174) 5'W C T C A A A W-3'	PyHpPyPyPy-γ-HpH _p H _p ImPyIm
	3175) 5'W C T C A A G W-3'	PyHpPyPyPyIm-γ-PyH _p H _p ImPyIm
	3176) 5'W C T C A A C W-3'	PyHpPyPyPyPy-γ-ImH _p H _p ImPyIm
	3177) 5'W C T C A G T W-3'	PyHpPyPyImH _p -γ-PyPyH _p ImPyIm
	3178) 5'W C T C A G A W-3'	PyHpPyPyImPy-γ-HpPyH _p ImPyIm
30	3179) 5'W C T C A G G W-3'	PyHpPyPyImIm-γ-PyPyH _p ImPyIm
	3180) 5'W C T C A G C W-3'	PyHpPyPyImPy-γ-ImPyH _p ImPyIm
	3181) 5'W C T C A C T W-3'	PyHpPyPyPyH _p -γ-PyImH _p ImPyIm
	3182) 5'W C T C A C A W-3'	PyHpPyPyPyPy-γ-HpImH _p ImPyIm
	3183) 5'W C T C A C G W-3'	PyHpPyPyPyIm-γ-PyImH _p ImPyIm
35	3184) 5'W C T C A C C W-3'	PyHpPyPyPyPy-γ-ImImH _p ImPyIm

TABLE 147: 12-ring Hairpin Polyamides for recognition of 8-bp 5'-WCTCSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	3185) 5'W C T C G T T W-3'	PyHpPyImHpH _p -γ-PyPyPyImPyIm
	3186) 5'W C T C G T A W-3'	PyHpPyImHpH _p Py-γ-HpPyPyImPyIm
	3187) 5'W C T C G T G W-3'	PyHpPyImHpIm-γ-PyPyPyImPyIm
	3188) 5'W C T C G T C W-3'	PyHpPyImHpPy-γ-ImPyPyImPyIm
	3189) 5'W C T C G A T W-3'	PyHpPyImPyH _p -γ-PyHpPyImPyIm
10	3190) 5'W C T C G A A W-3'	PyHpPyImPyPy-γ-HpH _p PyImPyIm
	3191) 5'W C T C G A G W-3'	PyHpPyImPyIm-γ-PyHpPyImPyIm
	3192) 5'W C T C G A C W-3'	PyHpPyImPyPy-γ-ImHpPyImPyIm
	3193) 5'W C T C G G T W-3'	PyHpPyImImH _p -γ-PyPyPyImPyIm
	3194) 5'W C T C G G A W-3'	PyHpPyImImPy-γ-HpPyPyImPyIm
15	3195) 5'W C T C G C T W-3'	PyHpPyImPyH _p -γ-PyImPyImPyIm
	3196) 5'W C T C G C A W-3'	PyHpPyImPyPy-γ-HpImPyImPyIm
	3197) 5'W C T C C T T W-3'	PyHpPyPyH _p H _p -γ-PyPyImImPyIm
	3198) 5'W C T C C T A W-3'	PyHpPyPyH _p Py-γ-HpPyImImPyIm
	3199) 5'W C T C C T G W-3'	PyHpPyPyH _p Im-γ-PyPyImImPyIm
20	3200) 5'W C T C C T C W-3'	PyHpPyPyH _p Py-γ-ImPyImImPyIm
	3201) 5'W C T C C A T W-3'	PyHpPyPyPyH _p -γ-PyH _p ImImPyIm
	3202) 5'W C T C C A A W-3'	PyHpPyPyPyPy-γ-HpH _p ImImPyIm
	3203) 5'W C T C C A G W-3'	PyHpPyPyPyIm-γ-PyH _p ImImPyIm
	3204) 5'W C T C C A C W-3'	PyHpPyPyPyPy-γ-ImH _p ImImPyIm
25	3205) 5'W C T C C G T W-3'	PyHpPyPyPyH _p -γ-PyPyImImPyIm
	3206) 5'W C T C C G A W-3'	PyHpPyPyImPy-γ-HpPyImImPyIm
	3207) 5'W C T C C C T W-3'	PyHpPyPyPyH _p -γ-PyImImImPyIm
	3208) 5'W C T C C C A W-3'	PyHpPyPyPyPy-γ-HpImImImPyIm
	3209) 5'W C T C G G G W-3'	PyHpPyImImIm-γ-PyPyPyImPyIm
30	3210) 5'W C T C G G C W-3'	PyHpPyImImPy-γ-ImPyPyImPyIm
	3211) 5'W C T C G C G W-3'	PyHpPyImPyIm-γ-PyImPyImPyIm
	3212) 5'W C T C G C C W-3'	PyHpPyImPyPy-γ-ImImPyImPyIm
	3213) 5'W C T C C G G W-3'	PyHpPyPyImIm-γ-PyPyImImPyIm
	3214) 5'W C T C C G C W-3'	PyHpPyPyImPy-γ-ImPyImImPyIm
35	3215) 5'W C T C C C G W-3'	PyHpPyPyPyIm-γ-PyImImImPyIm
	3216) 5'W C T C C C C W-3'	PyHpPyPyPyPy-γ-ImImImImPyIm

TABLE 148: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGGGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1233 β) 5'-W G G G T T T W-3'	ImImIm- β -HpHp- γ -PyPy- β -PyPyPy
5	1234 β) 5'-W G G G T T A W-3'	ImImIm- β -HpPy- γ -HpPy- β -PyPyPy
	1235 β) 5'-W G G G T T G W-3'	ImImIm- β -HpIm- γ -PyPy- β -PyPyPy
	1236 β) 5'-W G G G T T C W-3'	ImImIm- β -HpPy- γ -ImPy- β -PyPyPy
	1237 β) 5'-W G G G T A T W-3'	ImImIm- β -PyHp- γ -PyHp- β -PyPyPy
	1238 β) 5'-W G G G T A A W-3'	ImImIm- β -PyPy- γ -HpHp- β -PyPyPy
10	1239 β) 5'-W G G G T A G W-3'	ImImIm- β -PyIm- γ -PyHp- β -PyPyPy
	1240 β) 5'-W G G G T A C W-3'	ImImIm- β -PyPy- γ -ImHp- β -PyPyPy
	1241 β) 5'-W G G G T G T W-3'	ImImIm- β -ImHp- γ -PyPy- β -PyPyPy
	1242 β) 5'-W G G G T G A W-3'	ImImIm- β -ImPy- γ -HpPy- β -PyPyPy
	1243 β) 5'-W G G G T G G W-3'	ImImIm- β -ImIm- γ -PyPy- β -PyPyPy
15	1244 β) 5'-W G G G T G C W-3'	ImImIm- β -ImPy- γ -ImPy- β -PyPyPy
	1245 β) 5'-W G G G T C T W-3'	ImImIm- β -PyHp- γ -PyIm- β -PyPyPy
	1246 β) 5'-W G G G T C A W-3'	ImImIm- β -PyPy- γ -HpIm- β -PyPyPy
	1247 β) 5'-W G G G T C G W-3'	ImImIm- β -PyIm- γ -PyIm- β -PyPyPy
	1248 β) 5'-W G G G T C C W-3'	ImImIm- β -PyPy- γ -ImIm- β -PyPyPy
20	1249 β) 5'-W G G G A T T W-3'	ImImIm- β -HpHp- γ -PyPy- β -PyPyPy
	1250 β) 5'-W G G G A T A W-3'	ImImIm- β -HpPy- γ -HpPy- β -PyPyPy
	1251 β) 5'-W G G G A T G W-3'	ImImIm- β -HpIm- γ -PyPy- β -PyPyPy
	1252 β) 5'-W G G G A T C W-3'	ImImIm- β -HpPy- γ -ImPy- β -PyPyPy
	1253 β) 5'-W G G G A A T W-3'	ImImIm- β -PyHp- γ -PyHp- β -PyPyPy
25	1254 β) 5'-W G G G A A A W-3'	ImImIm- β -PyPy- γ -HpHp- β -PyPyPy
	1255 β) 5'-W G G G A A G W-3'	ImImIm- β -PyIm- γ -PyHp- β -PyPyPy
	1256 β) 5'-W G G G A A C W-3'	ImImIm- β -PyPy- γ -ImHp- β -PyPyPy
	1257 β) 5'-W G G G A G T W-3'	ImImIm- β -ImHp- γ -PyPy- β -PyPyPy
	1258 β) 5'-W G G G A G A W-3'	ImImIm- β -ImPy- γ -HpPy- β -PyPyPy
30	1259 β) 5'-W G G G A G G W-3'	ImImIm- β -ImIm- γ -PyPy- β -PyPyPy
	1260 β) 5'-W G G G A G C W-3'	ImImIm- β -ImPy- γ -ImPy- β -PyPyPy
	1261 β) 5'-W G G G A C T W-3'	ImImIm- β -PyHp- γ -PyIm- β -PyPyPy
	1262 β) 5'-W G G G A C A W-3'	ImImIm- β -PyPy- γ -HpIm- β -PyPyPy
	1263 β) 5'-W G G G A C G W-3'	ImImIm- β -PyIm- γ -PyIm- β -PyPyPy
35	1264 β) 5'-W G G G A C C W-3'	ImImIm- β -PyPy- γ -ImIm- β -PyPyPy

TABLE 149: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGGGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1265 β) 5'-W G G G G T T W-3'	I _m I _m I _m I _m - β -H _p - γ -P _y - β -P _y P _y P _y P _y
	1266 β) 5'-W G G G G T A W-3'	I _m I _m I _m I _m - β -P _y - γ -H _p - β -P _y P _y P _y P _y
	1267 β) 5'-W G G G G T G W-3'	I _m I _m I _m I _m - β -I _m - γ -P _y - β -P _y P _y P _y P _y
	1268 β) 5'-W G G G G T C W-3'	I _m I _m I _m I _m - β -P _y - γ -I _m - β -P _y P _y P _y P _y
	1269 β) 5'-W G G G G A T W-3'	I _m I _m I _m I _m - β -H _p - γ -P _y - β -P _y P _y P _y P _y
10	1270 β) 5'-W G G G G A A W-3'	I _m I _m I _m I _m - β -P _y - γ -H _p - β -P _y P _y P _y P _y
	1271 β) 5'-W G G G G A G W-3'	I _m I _m I _m I _m - β -I _m - γ -P _y - β -P _y P _y P _y P _y
	1272 β) 5'-W G G G G A C W-3'	I _m I _m I _m I _m - β -P _y - γ -I _m - β -P _y P _y P _y P _y
	1275 β) 5'-W G G G G C T W-3'	I _m I _m I _m I _m - β -H _p - γ -P _y I _m P _y - β -P _y P _y
	1276 β) 5'-W G G G G C A W-3'	I _m I _m I _m I _m - β -P _y - γ -H _p I _m P _y - β -P _y P _y
	1277 β) 5'-W G G G C T T W-3'	I _m I _m I _m - β -H _p H _p - γ -P _y P _y I _m - β -P _y P _y
15	1278 β) 5'-W G G G C T A W-3'	I _m I _m I _m - β -H _p P _y - γ -H _p P _y I _m - β -P _y P _y
	1279 β) 5'-W G G G C T G W-3'	I _m I _m I _m - β -H _p I _m - γ -P _y P _y I _m - β -P _y P _y
	1280 β) 5'-W G G G C T C W-3'	I _m I _m I _m - β -H _p P _y - γ -I _m P _y I _m - β -P _y P _y
	1281 β) 5'-W G G G C A T W-3'	I _m I _m I _m - β -P _y H _p - γ -P _y H _p I _m - β -P _y P _y
	1282 β) 5'-W G G G C A A W-3'	I _m I _m I _m - β -P _y P _y - γ -H _p H _p I _m - β -P _y P _y
20	1283 β) 5'-W G G G C A G W-3'	I _m I _m I _m - β -P _y I _m - γ -P _y H _p I _m - β -P _y P _y
	1284 β) 5'-W G G G C A C W-3'	I _m I _m I _m - β -P _y P _y - γ -I _m H _p I _m - β -P _y P _y
	1285 β) 5'-W G G G C G T W-3'	I _m I _m I _m - β -I _m H _p - γ -P _y P _y I _m - β -P _y P _y
	1286 β) 5'-W G G G C G A W-3'	I _m I _m I _m - β -I _m P _y - γ -H _p P _y I _m - β -P _y P _y
	1287 β) 5'-W G G G C C T W-3'	I _m I _m I _m - β -P _y H _p - γ -P _y I _m I _m - β -P _y P _y
25	1288 β) 5'-W G G G C C A W-3'	I _m I _m I _m - β -P _y P _y - γ -H _p I _m I _m - β -P _y P _y
	G52 β) 5'-W G G G G C C W-3'	I _m I _m I _m - β -P _y - γ -I _m I _m P _y - β -P _y P _y
	G53 β) 5'-W G G G C G G W-3'	I _m I _m I _m - β -I _m I _m - γ -P _y P _y I _m - β -P _y P _y
	G54 β) 5'-W G G G C G C W-3'	I _m I _m I _m - β -I _m P _y - γ -I _m P _y I _m - β -P _y P _y
	G55 β) 5'-W G G G C C G W-3'	I _m I _m I _m - β -P _y I _m - γ -P _y I _m I _m - β -P _y P _y
30	G56 β) 5'-W G G G C C C W-3'	I _m I _m I _m - β -P _y P _y - γ -I _m I _m I _m - β -P _y P _y

TABLE 150: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGGTWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1289 β) 5'-W G G T T T T W-3'	ImIm- β -HpHpHp- γ -PyPyPy- β -PyPy
	1290 β) 5'-W G G T T T T A W-3'	ImIm- β -HpHpPy- γ -HpPyPy- β -PyPy
5	1291 β) 5'-W G G T T T G W-3'	ImIm- β -HpHpIm- γ -PyPyPy- β -PyPy
	1292 β) 5'-W G G T T T C W-3'	ImIm- β -HpHpPy- γ -ImPyPy- β -PyPy
	1293 β) 5'-W G G T T A T W-3'	ImIm- β -HpPyHp- γ -PyHpPy- β -PyPy
	1294 β) 5'-W G G T T A A W-3'	ImIm- β -HpPyPy- γ -HpHpPy- β -PyPy
	1295 β) 5'-W G G T T A G W-3'	ImIm- β -HpPyIm- γ -PyHpPy- β -PyPy
10	1296 β) 5'-W G G T T A C W-3'	ImIm- β -HpPyPy- γ -ImHpPy- β -PyPy
	1297 β) 5'-W G G T T G T W-3'	ImIm- β -HpImHp- γ -PyPyPy- β -PyPy
	1298 β) 5'-W G G T T G A W-3'	ImIm- β -HpImPy- γ -HpPyPy- β -PyPy
	1299 β) 5'-W G G T T G G W-3'	ImIm- β -HpImIm- γ -PyPyPy- β -PyPy
	1300 β) 5'-W G G T T G C W-3'	ImIm- β -HpImPy- γ -ImPyPy- β -PyPy
15	1301 β) 5'-W G G T T C T W-3'	ImIm- β -HpPyHp- γ -PyImPy- β -PyPy
	1302 β) 5'-W G G T T C A W-3'	ImIm- β -HpPyPy- γ -HpImPy- β -PyPy
	1303 β) 5'-W G G T T C G W-3'	ImIm- β -HpPyIm- γ -PyImPy- β -PyPy
	1304 β) 5'-W G G T T C C W-3'	ImIm- β -HpPyPy- γ -ImImPy- β -PyPy
	1305 β) 5'-W G G T A T T W-3'	ImIm- β -PyHpHp- γ -PyPyH- β -PyPy
20	1306 β) 5'-W G G T A T A W-3'	ImIm- β -PyH- γ -HpPyH- β -PyPy
	1307 β) 5'-W G G T A T G W-3'	ImIm- β -PyH- γ -PyPyH- β -PyPy
	1308 β) 5'-W G G T A T C W-3'	ImIm- β -PyH- γ -ImPyH- β -PyPy
	1309 β) 5'-W G G T A A T W-3'	ImIm- β -PyH- γ -PyH- β -PyPy
	1310 β) 5'-W G G T A A A W-3'	ImIm- β -PyPyPy- γ -HpH- β -PyPy
25	1311 β) 5'-W G G T A A G W-3'	ImIm- β -PyPyIm- γ -PyH- β -PyPy
	1312 β) 5'-W G G T A A C W-3'	ImIm- β -PyPyPy- γ -ImH- β -PyPy
	1313 β) 5'-W G G T A G T W-3'	ImIm- β -PyImH- γ -PyPyH- β -PyPy
	1314 β) 5'-W G G T A G A W-3'	ImIm- β -PyImPy- γ -HpPyH- β -PyPy
	1315 β) 5'-W G G T A G G W-3'	ImIm- β -PyImIm- γ -PyPyH- β -PyPy
30	1316 β) 5'-W G G T A G C W-3'	ImIm- β -PyImPy- γ -ImPyH- β -PyPy
	1317 β) 5'-W G G T A C T W-3'	ImIm- β -PyPyH- γ -PyImH- β -PyPy
	1318 β) 5'-W G G T A C A W-3'	ImIm- β -PyPyPy- γ -HpImH- β -PyPy
	1319 β) 5'-W G G T A C G W-3'	ImIm- β -PyPyIm- γ -PyImH- β -PyPy
	1320 β) 5'-W G G T A C C W-3'	ImIm- β -PyPyPy- γ -ImImH- β -PyPy

TABLE 151: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1321β) 5'-W G G T G T T W-3'	ImIm-β-ImHpHp-γ-PyPyPy-β-PyPy
	1322β) 5'-W G G T G T A W-3'	ImIm-β-ImHpPy-γ-HpPyPy-β-PyPy
	1323β) 5'-W G G T G T G W-3'	ImIm-β-ImHpIm-γ-PyPyPy-β-PyPy
	1324β) 5'-W G G T G T C W-3'	ImIm-β-ImHpPy-γ-ImPyPy-β-PyPy
	1325β) 5'-W G G T G A T W-3'	ImIm-β-ImPyHp-γ-PyHpPy-β-PyPy
	1326β) 5'-W G G T G A A W-3'	ImIm-β-ImPyPy-γ-HpHpPy-β-PyPy
10	1327β) 5'-W G G T G A G W-3'	ImIm-β-ImPyIm-γ-PyHpPy-β-PyPy
	1328β) 5'-W G G T G A C W-3'	ImIm-β-ImPyPy-γ-ImHpPy-β-PyPy
	1329β) 5'-W G G T G G T W-3'	ImIm-β-ImImHp-γ-PyPyPy-β-PyPy
	1330β) 5'-W G G T G G A W-3'	ImIm-β-ImImPy-γ-HpPyPy-β-PyPy
	1331β) 5'-W G G T G C T W-3'	ImIm-β-ImPyHp-γ-PyImPy-β-PyPy
15	1332β) 5'-W G G T G C A W-3'	ImIm-β-ImPyPy-γ-HpImPy-β-PyPy
	1333β) 5'-W G G T G G G W-3'	ImIm-β-ImImIm-γ-PyPyPy-β-PyPy
	1334β) 5'-W G G T G G C W-3'	ImIm-β-ImImPy-γ-ImPyPy-β-PyPy
	1335β) 5'-W G G T G C G W-3'	ImIm-β-ImPyIm-γ-PyImPy-β-PyPy
	1336β) 5'-W G G T G C C W-3'	ImIm-β-ImPyPy-γ-ImImPy-β-PyPy
20	1337β) 5'-W G G T C T T W-3'	ImIm-β-PyHpHp-γ-PyPyIm-β-PyPy
	1338β) 5'-W G G T C T A W-3'	ImIm-β-PyHpPy-γ-HpPyIm-β-PyPy
	1339β) 5'-W G G T C T G W-3'	ImIm-β-PyHpIm-γ-PyPyIm-β-PyPy
	1340β) 5'-W G G T C T C W-3'	ImIm-β-PyHpPy-γ-ImPyIm-β-PyPy
	1341β) 5'-W G G T C A T W-3'	ImIm-β-PyPyHp-γ-PyHpIm-β-PyPy
25	1342β) 5'-W G G T C A A W-3'	ImIm-β-PyPyPy-γ-HpHpIm-β-PyPy
	1343β) 5'-W G G T C A G W-3'	ImIm-β-PyPyIm-γ-PyHpIm-β-PyPy
	1344β) 5'-W G G T C A C W-3'	ImIm-β-PyPyPy-γ-ImHpIm-β-PyPy
	1345β) 5'-W G G T C G T W-3'	ImIm-β-PyImHp-γ-PyPyIm-β-PyPy
	1346β) 5'-W G G T C G A W-3'	ImIm-β-PyImPy-γ-HpPyIm-β-PyPy
30	1347β) 5'-W G G T C C T W-3'	ImIm-β-PyPyHp-γ-PyImIm-β-PyPy
	1348β) 5'-W G G T C C A W-3'	ImIm-β-PyPyPy-γ-HpImIm-β-PyPy
	1349β) 5'-W G G T C G G W-3'	ImIm-β-PyImIm-γ-PyPyIm-β-PyPy
	1350β) 5'-W G G T C G C W-3'	ImIm-β-PyImPy-γ-ImPyIm-β-PyPy
	1351β) 5'-W G G T C C G W-3'	ImIm-β-PyPyIm-γ-PyImIm-β-PyPy
35	1352β) 5'-W G G T C C C W-3'	ImIm-β-PyPyPy-γ-ImImIm-β-PyPy

TABLE 152: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGGAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1353 β) 5'-W G G A T T T W-3'	ImIm- β -HpHpHp- γ -PyPyPy- β -PyPy
	1354 β) 5'-W G G A T T A W-3'	ImIm- β -HpHpPy- γ -HpPyPy- β -PyPy
	1355 β) 5'-W G G A T T G W-3'	ImIm- β -HpHpIm- γ -PyPyPy- β -PyPy
	1356 β) 5'-W G G A T T C W-3'	ImIm- β -HpHpPy- γ -ImPyPy- β -PyPy
	1357 β) 5'-W G G A T A T W-3'	ImIm- β -HpPyHp- γ -PyHpPy- β -PyPy
10	1358 β) 5'-W G G A T A A W-3'	ImIm- β -HpPyPy- γ -HpHpPy- β -PyPy
	1359 β) 5'-W G G A T A G W-3'	ImIm- β -HpPyIm- γ -PyHpPy- β -PyPy
	1360 β) 5'-W G G A T A C W-3'	ImIm- β -HpPyPy- γ -ImHpPy- β -PyPy
	1361 β) 5'-W G G A T G T W-3'	ImIm- β -HpImHp- γ -PyPyPy- β -PyPy
	1362 β) 5'-W G G A T G A W-3'	ImIm- β -HpImPy- γ -HpPyPy- β -PyPy
	1363 β) 5'-W G G A T G G W-3'	ImIm- β -HpImIm- γ -PyPyPy- β -PyPy
15	1364 β) 5'-W G G A T G C W-3'	ImIm- β -HpImPy- γ -ImPyPy- β -PyPy
	1365 β) 5'-W G G A T C T W-3'	ImIm- β -HpPyHp- γ -PyImPy- β -PyPy
	1366 β) 5'-W G G A T C A W-3'	ImIm- β -HpPyPy- γ -HpImPy- β -PyPy
	1367 β) 5'-W G G A T C G W-3'	ImIm- β -HpPyIm- γ -PyImPy- β -PyPy
	1368 β) 5'-W G G A T C C W-3'	ImIm- β -HpPyPy- γ -ImImPy- β -PyPy
20	1369 β) 5'-W G G A A T T W-3'	ImIm- β -PyHpHp- γ -PyPyHp- β -PyPy
	1370 β) 5'-W G G A A T A W-3'	ImIm- β -PyHpPy- γ -HpPyHp- β -PyPy
	1371 β) 5'-W G G A A T G W-3'	ImIm- β -PyHpIm- γ -PyPyHp- β -PyPy
	1372 β) 5'-W G G A A T C W-3'	ImIm- β -PyHpPy- γ -ImPyHp- β -PyPy
	1373 β) 5'-W G G A A A T W-3'	ImIm- β -PyPyHp- γ -PyHpHp- β -PyPy
25	1374 β) 5'-W G G A A A A W-3'	ImIm- β -PyPyPy- γ -HpHpHp- β -PyPy
	1375 β) 5'-W G G A A A G W-3'	ImIm- β -PyPyIm- γ -PyHpHp- β -PyPy
	1376 β) 5'-W G G A A A C W-3'	ImIm- β -PyPyPy- γ -ImHpHp- β -PyPy
	1377 β) 5'-W G G A A G T W-3'	ImIm- β -PyImHp- γ -PyPyHp- β -PyPy
	1378 β) 5'-W G G A A G A W-3'	ImIm- β -PyImPy- γ -HpPyHp- β -PyPy
30	1379 β) 5'-W G G A A G G W-3'	ImIm- β -PyImIm- γ -PyPyHp- β -PyPy
	1380 β) 5'-W G G A A G C W-3'	ImIm- β -PyImPy- γ -ImPyHp- β -PyPy
	1381 β) 5'-W G G A A C T W-3'	ImIm- β -PyPyHp- γ -PyImHp- β -PyPy
	1382 β) 5'-W G G A A C A W-3'	ImIm- β -PyPyPy- γ -HpImHp- β -PyPy
	1383 β) 5'-W G G A A C G W-3'	ImIm- β -PyPyIm- γ -PyImHp- β -PyPy
35	1384 β) 5'-W G G A A C C W-3'	ImIm- β -PyPyPy- γ -ImImHp- β -PyPy

TABLE 153: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGGASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1385β) 5'-W G G A G T T W-3'	ImIm-β-ImHpHp-γ-PyPyPy-β-PyPy
	1386β) 5'-W G G A G T A W-3'	ImIm-β-ImHpPy-γ-HpPyPy-β-PyPy
	1387β) 5'-W G G A G T G W-3'	ImIm-β-ImHpIm-γ-PyPyPy-β-PyPy
	1388β) 5'-W G G A G T C W-3'	ImIm-β-ImHpPy-γ-ImPyPy-β-PyPy
	1389β) 5'-W G G A G A T W-3'	ImIm-β-ImPyHp-γ-PyHpPy-β-PyPy
10	1390β) 5'-W G G A G A A W-3'	ImIm-β-ImPyPy-γ-HpHpPy-β-PyPy
	1391β) 5'-W G G A G A G W-3'	ImIm-β-ImPyIm-γ-PyHpPy-β-PyPy
	1392β) 5'-W G G A G A C W-3'	ImIm-β-ImPyPy-γ-ImHpPy-β-PyPy
	1393β) 5'-W G G A G G T W-3'	ImIm-β-ImImHp-γ-PyPyPy-β-PyPy
	1394β) 5'-W G G A G G A W-3'	ImIm-β-ImImPy-γ-HpPyPy-β-PyPy
15	1395β) 5'-W G G A G C T W-3'	ImIm-β-ImPyHp-γ-PyImPy-β-PyPy
	1396β) 5'-W G G A G C A W-3'	ImIm-β-ImPyPy-γ-HpImPy-β-PyPy
	1397β) 5'-W G G A G G G W-3'	ImIm-β-ImImIm-γ-PyPyPy-β-PyPy
	1398β) 5'-W G G A G G C W-3'	ImIm-β-ImImPy-γ-ImPyPy-β-PyPy
	1399β) 5'-W G G A G C G W-3'	ImIm-β-ImPyIm-γ-PyImPy-β-PyPy
20	1400β) 5'-W G G A G C C W-3'	ImIm-β-ImPyPy-γ-ImImPy-β-PyPy
	1401β) 5'-W G G A C T T W-3'	ImIm-β-PyHpHp-γ-PyPyIm-β-PyPy
	1402β) 5'-W G G A C T A W-3'	ImIm-β-PyHpPy-γ-HpPyIm-β-PyPy
	1403β) 5'-W G G A C T G W-3'	ImIm-β-PyHpIm-γ-PyPyIm-β-PyPy
	1404β) 5'-W G G A C T C W-3'	ImIm-β-PyHpPy-γ-ImPyIm-β-PyPy
25	1405β) 5'-W G G A C A T W-3'	ImIm-β-PyPyHp-γ-PyHpIm-β-PyPy
	1406β) 5'-W G G A C A A W-3'	ImIm-β-PyPyPy-γ-HpHpIm-β-PyPy
	1407β) 5'-W G G A C A G W-3'	ImIm-β-PyPyIm-γ-PyHpIm-β-PyPy
	1408β) 5'-W G G A C A C W-3'	ImIm-β-PyPyPy-γ-ImHpIm-β-PyPy
	1409β) 5'-W G G A C G T W-3'	ImIm-β-PyImHp-γ-PyPyIm-β-PyPy
	1410β) 5'-W G G A C G A W-3'	ImIm-β-PyImPy-γ-HpPyIm-β-PyPy
30	1411β) 5'-W G G A C C T W-3'	ImIm-β-PyPyHp-γ-PyImIm-β-PyPy
	1412β) 5'-W G G A C C A W-3'	ImIm-β-PyPyPy-γ-HpImIm-β-PyPy
	1413β) 5'-W G G A C C G W-3'	ImIm-β-PyImIm-γ-PyPyIm-β-PyPy
	1414β) 5'-W G G A C G C W-3'	ImIm-β-PyImPy-γ-ImPyIm-β-PyPy
	1415β) 5'-W G G A C C G W-3'	ImIm-β-PyPyIm-γ-PyImIm-β-PyPy
35	1416β) 5'-W G G A C C C W-3'	ImIm-β-PyPyPy-γ-ImImIm-β-PyPy

TABLE 154: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGGCWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1417 β) 5'-W G G C T T T W-3'	ImImPy- β -HpHp- γ -PyPy- β -ImPyPy
	1418 β) 5'-W G G C T T A W-3'	ImImPy- β -HpPy- γ -HpPy- β -ImPyPy
	1419 β) 5'-W G G C T T G W-3'	ImImPy- β -HpIm- γ -PyPy- β -ImPyPy
	1420 β) 5'-W G G C T T C W-3'	ImImPy- β -HpPy- γ -ImPy- β -ImPyPy
	1421 β) 5'-W G G C T A T W-3'	ImImPy- β -PyHp- γ -PyHp- β -ImPyPy
10	1422 β) 5'-W G G C T A A W-3'	ImImPy- β -PyPy- γ -HpHp- β -ImPyPy
	1423 β) 5'-W G G C T A G W-3'	ImImPy- β -PyIm- γ -PyHp- β -ImPyPy
	1424 β) 5'-W G G C T A C W-3'	ImImPy- β -PyPy- γ -ImHp- β -ImPyPy
	1425 β) 5'-W G G C T G T W-3'	ImImPy- β -ImHp- γ -PyPy- β -ImPyPy
	1426 β) 5'-W G G C T G A W-3'	ImImPy- β -ImPy- γ -HpPy- β -ImPyPy
	1427 β) 5'-W G G C T G G W-3'	ImImPy- β -ImIm- γ -PyPy- β -ImPyPy
15	1428 β) 5'-W G G C T G C W-3'	ImImPy- β -ImPy- γ -ImPy- β -ImPyPy
	1429 β) 5'-W G G C T C T W-3'	ImImPy- β -PyHp- γ -PyIm- β -ImPyPy
	1430 β) 5'-W G G C T C A W-3'	ImImPy- β -PyPy- γ -HpIm- β -ImPyPy
	1431 β) 5'-W G G C T C G W-3'	ImImPy- β -PyIm- γ -PyIm- β -ImPyPy
	1432 β) 5'-W G G C T C C W-3'	ImImPy- β -PyPy- γ -ImIm- β -ImPyPy
20	1433 β) 5'-W G G C A T T W-3'	ImImPy- β -HpHp- γ -PyPy- β -ImPyPy
	1434 β) 5'-W G G C A T A W-3'	ImImPy- β -HpPy- γ -HpPy- β -ImPyPy
	1435 β) 5'-W G G C A T G W-3'	ImImPy- β -HpIm- γ -PyPy- β -ImPyPy
	1436 β) 5'-W G G C A T C W-3'	ImImPy- β -HpPy- γ -ImPy- β -ImPyPy
	1437 β) 5'-W G G C A A T W-3'	ImImPy- β -PyHp- γ -PyHp- β -ImPyPy
25	1438 β) 5'-W G G C A A A W-3'	ImImPy- β -PyPy- γ -HpHp- β -ImPyPy
	1439 β) 5'-W G G C A A G W-3'	ImImPy- β -PyIm- γ -PyHp- β -ImPyPy
	1440 β) 5'-W G G C A A C W-3'	ImImPy- β -PyPy- γ -ImHp- β -ImPyPy
	1441 β) 5'-W G G C A G T W-3'	ImImPy- β -ImHp- γ -PyPy- β -ImPyPy
	1442 β) 5'-W G G C A G A W-3'	ImImPy- β -ImPy- γ -HpPy- β -ImPyPy
30	1443 β) 5'-W G G C A G G W-3'	ImImPy- β -ImIm- γ -PyPy- β -ImPyPy
	1444 β) 5'-W G G C A G C W-3'	ImImPy- β -ImPy- γ -ImPy- β -ImPyPy
	1445 β) 5'-W G G C A C T W-3'	ImImPy- β -PyHp- γ -PyIm- β -ImPyPy
	1446 β) 5'-W G G C A C A W-3'	ImImPy- β -PyPy- γ -HpIm- β -ImPyPy
	1447 β) 5'-W G G C A C G W-3'	ImImPy- β -PyIm- γ -PyIm- β -ImPyPy
35	1448 β) 5'-W G G C A C C W-3'	ImImPy- β -PyPy- γ -ImIm- β -ImPyPy

TABLE 155: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGGCSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1449 β) 5'-W G G C G T T W-3'	ImIm- β -ImHpH γ -PyPy- β -ImPyPy
	1450 β) 5'-W G G C G T A W-3'	ImIm- β -ImHpPy- γ -H β Py- β -ImPyPy
	1451 β) 5'-W G G C G T G W-3'	ImIm- β -ImHpIm- γ -PyPy- β -ImPyPy
	1452 β) 5'-W G G C G T C W-3'	ImIm- β -ImHpPy- γ -ImPy- β -ImPyPy
	1453 β) 5'-W G G C G A T W-3'	ImIm- β -ImPyH γ -PyH β -ImPyPy
10	1454 β) 5'-W G G C G A A W-3'	ImIm- β -ImPyPy- γ -H β H β - β -ImPyPy
	1455 β) 5'-W G G C G A G W-3'	ImIm- β -ImPyIm- γ -PyH β - β -ImPyPy
	1456 β) 5'-W G G C G A C W-3'	ImIm- β -ImPyPy- γ -ImH β - β -ImPyPy
	1457 β) 5'-W G G C G G T W-3'	ImIm- β -ImImH γ -PyPy- β -ImPyPy
	1458 β) 5'-W G G C G G A W-3'	ImIm- β -ImImPy- γ -H β Py- β -ImPyPy
15	1459 β) 5'-W G G C G C T W-3'	ImIm- β -ImPyH γ -PyIm- β -ImPyPy
	1460 β) 5'-W G G C G C A W-3'	ImIm- β -ImPyPy- γ -H β Im- β -ImPyPy
	1461 β) 5'-W G G C C T T W-3'	ImIm- β -PyH γ Py- γ -Py- β -ImImPyPy
	1462 β) 5'-W G G C C T A W-3'	ImIm- β -PyH γ Py- γ -H β - β -ImImPyPy
	1463 β) 5'-W G G C C T G W-3'	ImIm- β -PyH γ Py- γ -Py- β -ImImPyPy
	1464 β) 5'-W G G C C T C W-3'	ImIm- β -PyH γ Py- γ -Im- β -ImImPyPy
20	1465 β) 5'-W G G C C A T W-3'	ImIm- β -PyPyH γ -Py- β -ImImPyPy
	1466 β) 5'-W G G C C A A W-3'	ImIm- β -PyPyPy- γ -H β - β -ImImPyPy
	1467 β) 5'-W G G C C A G W-3'	ImIm- β -PyPyIm- γ -Py- β -ImImPyPy
	1468 β) 5'-W G G C C A C W-3'	ImIm- β -PyPyPy- γ -Im- β -ImImPyPy
	1469 β) 5'-W G G C C G T W-3'	ImIm- β -PyImH γ -Py- β -ImImPyPy
25	1470 β) 5'-W G G C C G A W-3'	ImIm- β -PyImPy- γ -H β - β -ImImPyPy
	1471 β) 5'-W G G C C C T W-3'	ImIm- β -PyPyH γ -PyImIm- β -Py
	1472 β) 5'-W G G C C C A W-3'	ImIm- β -PyPyPy- γ -H β ImIm- β -Py
	G57 β) 5'-W G G C G G G W-3'	ImIm- β -ImImIm- γ -PyPy- β -ImPyPy
	G58 β) 5'-W G G C G G C W-3'	ImIm- β -ImImPy- γ -ImPy- β -ImPyPy
30	G59 β) 5'-W G G C G C G W-3'	ImIm- β -ImPyIm- γ -PyIm- β -ImPyPy
	G60 β) 5'-W G G C G C C W-3'	ImIm- β -ImPyPy- γ -ImIm- β -ImPyPy
	G61 β) 5'-W G G C C G G W-3'	ImIm- β -PyImIm- γ -Py- β -ImImPyPy
	G62 β) 5'-W G G C C G C W-3'	ImIm- β -PyImPy- γ -Im- β -ImImPyPy
	G63 β) 5'-W G G C C C G W-3'	ImIm- β -PyPyIm- γ -PyImIm- β -Py
35	G64 β) 5'-W G G C C C C W-3'	ImIm- β -PyPyPy- γ -ImImIm- β -Py

TABLE 156: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCGWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1473β) 5'-W G C G T T T W-3'	ImPyIm-β-HpHp-γ-PyPyPy-β-ImPy
	1474β) 5'-W G C G T T A W-3'	ImPyIm-β-HpPy-γ-HpPyPy-β-ImPy
	1475β) 5'-W G C G T T G W-3'	ImPyIm-β-HpIm-γ-PyPyPy-β-ImPy
	1476β) 5'-W G C G T T C W-3'	ImPyIm-β-HpPy-γ-ImPyPy-β-ImPy
	1477β) 5'-W G C G T A T W-3'	ImPyIm-β-PyHp-γ-PyHpPy-β-ImPy
10	1478β) 5'-W G C G T A A W-3'	ImPyIm-β-PyPy-γ-HpHpPy-β-ImPy
	1479β) 5'-W G C G T A G W-3'	ImPyIm-β-PyIm-γ-PyHpPy-β-ImPy
	1480β) 5'-W G C G T A C W-3'	ImPyIm-β-PyPy-γ-ImHpPy-β-ImPy
	1481β) 5'-W G C G T G T W-3'	ImPyIm-β-ImHp-γ-PyPyPy-β-ImPy
	1482β) 5'-W G C G T G A W-3'	ImPyIm-β-ImPy-γ-HpPyPy-β-ImPy
15	1483β) 5'-W G C G T G G W-3'	ImPyIm-β-ImIm-γ-PyPyPy-β-ImPy
	1484β) 5'-W G C G T G C W-3'	ImPyIm-β-ImPy-γ-ImPyPy-β-ImPy
	1485β) 5'-W G C G T C T W-3'	ImPyIm-β-PyHp-γ-PyImPy-β-ImPy
	1486β) 5'-W G C G T C A W-3'	ImPyIm-β-PyPy-γ-HpImPy-β-ImPy
	1487β) 5'-W G C G T C G W-3'	ImPyIm-β-PyIm-γ-PyImPy-β-ImPy
20	1488β) 5'-W G C G T C C W-3'	ImPyIm-β-PyPy-γ-ImImPy-β-ImPy
	1489β) 5'-W G C G A T T W-3'	ImPyIm-β-HpHp-γ-PyPyHp-β-ImPy
	1490β) 5'-W G C G A T A W-3'	ImPyIm-β-HpPy-γ-HpPyHp-β-ImPy
	1491β) 5'-W G C G A T G W-3'	ImPyIm-β-HpIm-γ-PyPyHp-β-ImPy
	1492β) 5'-W G C G A T C W-3'	ImPyIm-β-HpPy-γ-ImPyHp-β-ImPy
25	1493β) 5'-W G C G A A T W-3'	ImPyIm-β-PyHp-γ-PyHpHp-β-ImPy
	1494β) 5'-W G C G A A A W-3'	ImPyIm-β-PyPy-γ-HpHpHp-β-ImPy
	1495β) 5'-W G C G A A G W-3'	ImPyIm-β-PyIm-γ-PyHpHp-β-ImPy
	1496β) 5'-W G C G A A C W-3'	ImPyIm-β-PyPy-γ-ImHpHp-β-ImPy
	1497β) 5'-W G C G A G T W-3'	ImPyIm-β-ImHp-γ-PyPyHp-β-ImPy
	1498β) 5'-W G C G A G A W-3'	ImPyIm-β-ImPy-γ-HpPyHp-β-ImPy
30	1499β) 5'-W G C G A G G W-3'	ImPyIm-β-ImIm-γ-PyPyHp-β-ImPy
	1500β) 5'-W G C G A G C W-3'	ImPyIm-β-ImPy-γ-ImPyHp-β-ImPy
	1501β) 5'-W G C G A C T W-3'	ImPyIm-β-PyHp-γ-PyImHp-β-ImPy
	1502β) 5'-W G C G A C A W-3'	ImPyIm-β-PyPy-γ-HpImHp-β-ImPy
	1503β) 5'-W G C G A C G W-3'	ImPyIm-β-PyIm-γ-PyImHp-β-ImPy
35	1504β) 5'-W G C G A C C W-3'	ImPyIm-β-PyPy-γ-ImImHp-β-ImPy

TABLE 157: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGCGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1505 β) 5'-W G C G G T T W-3'	Im- β -ImImHpHp- γ -PyPyPy- β -ImPy
	1506 β) 5'-W G C G G T A W-3'	Im- β -ImImHpPy- γ -HpPyPy- β -ImPy
	1507 β) 5'-W G C G G T G W-3'	Im- β -ImImHpIm- γ -PyPyPy- β -ImPy
10	1508 β) 5'-W G C G G T C W-3'	Im- β -ImImHpPy- γ -ImPyPy- β -ImPy
	1509 β) 5'-W G C G G A T W-3'	Im- β -ImImPyHp- γ -PyHpPy- β -ImPy
	1510 β) 5'-W G C G G A A W-3'	Im- β -ImImPyPy- γ -HpHpPy- β -ImPy
15	1511 β) 5'-W G C G G A G W-3'	Im- β -ImImPyIm- γ -PyHpPy- β -ImPy
	1512 β) 5'-W G C G G A C W-3'	Im- β -ImImPyPy- γ -ImHpPy- β -ImPy
	1513 β) 5'-W G C G G G T W-3'	Im- β -ImImImHp- γ -PyPyPy- β -ImPy
	1514 β) 5'-W G C G G G A W-3'	Im- β -ImImImPy- γ -HpPyPy- β -ImPy
20	1515 β) 5'-W G C G G C T W-3'	Im- β -ImImPyHp- γ -PyImPy- β -ImPy
	1516 β) 5'-W G C G G C A W-3'	Im- β -ImImPyPy- γ -HpImPy- β -ImPy
	1517 β) 5'-W G C G C T T W-3'	ImPyIm- β -HpHp- γ -PyPyIm- β -ImPy
	1518 β) 5'-W G C G C T A W-3'	ImPyIm- β -HpPy- γ -HpPyIm- β -ImPy
	1519 β) 5'-W G C G C T G W-3'	ImPyIm- β -HpIm- γ -PyPyIm- β -ImPy
25	1520 β) 5'-W G C G C T C W-3'	ImPyIm- β -HpPy- γ -ImPyIm- β -ImPy
	1521 β) 5'-W G C G C A T W-3'	ImPyIm- β -PyHp- γ -PyHpIm- β -ImPy
	1522 β) 5'-W G C G C A A W-3'	ImPyIm- β -PyPy- γ -HpHpIm- β -ImPy
	1523 β) 5'-W G C G C A G W-3'	ImPyIm- β -PyIm- γ -PyHpIm- β -ImPy
	1524 β) 5'-W G C G C A C W-3'	ImPyIm- β -PyPy- γ -ImHpIm- β -ImPy
30	1525 β) 5'-W G C G C G T W-3'	ImPyIm- β -ImHp- γ -PyPyIm- β -ImPy
	1526 β) 5'-W G C G C G A W-3'	ImPyIm- β -ImPy- γ -HpPyIm- β -ImPy
	1527 β) 5'-W G C G C C T W-3'	ImPyIm- β -PyHp- γ -PyImIm- β -ImPy
	1528 β) 5'-W G C G C C A W-3'	ImPyIm- β -PyPy- γ -HpImIm- β -ImPy
	G65 β) 5'-W G C G G G G W-3'	Im- β -ImImImIm- γ -PyPyPy- β -ImPy
	G66 β) 5'-W G C G G G C W-3'	Im- β -ImImImPy- γ -ImPyPy- β -ImPy
35	G67 β) 5'-W G C G G C G W-3'	Im- β -ImImPyIm- γ -PyImPy- β -ImPy
	G68 β) 5'-W G C G G C C W-3'	Im- β -ImImPyPy- γ -ImImPy- β -ImPy
	G69 β) 5'-W G C G C G G W-3'	ImPyIm- β -ImIm- γ -PyPyIm- β -ImPy
	G70 β) 5'-W G C G C G C W-3'	ImPyIm- β -ImPy- γ -ImPyIm- β -ImPy
	G71 β) 5'-W G C G C C G W-3'	ImPyIm- β -PyIm- γ -PyImIm- β -ImPy
	G72 β) 5'-W G C G C C C W-3'	ImPyIm- β -PyPy- γ -ImImIm- β -ImPy

TABLE 158: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGCTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1529 β) 5'-W G C T T T T W-3'	ImPy- β -HpHpHp- γ -PyPyPy- β -ImPy
	1530 β) 5'-W G C T T T A W-3'	ImPy- β -HpHpPy- γ -HpPyPy- β -ImPy
	1531 β) 5'-W G C T T T G W-3'	ImPy- β -HpHpIm- γ -PyPyPy- β -ImPy
	1532 β) 5'-W G C T T T C W-3'	ImPy- β -HpHpPy- γ -ImPyPy- β -ImPy
	1533 β) 5'-W G C T T A T W-3'	ImPy- β -HpPyHp- γ -PyHpPy- β -ImPy
10	1534 β) 5'-W G C T T A A W-3'	ImPy- β -HpPyPy- γ -HpHpPy- β -ImPy
	1535 β) 5'-W G C T T A G W-3'	ImPy- β -HpPyIm- γ -PyHpPy- β -ImPy
	1536 β) 5'-W G C T T A C W-3'	ImPy- β -HpPyPy- γ -ImHpPy- β -ImPy
	1537 β) 5'-W G C T T G T W-3'	ImPy- β -HpImHp- γ -PyPyPy- β -ImPy
	1538 β) 5'-W G C T T G A W-3'	ImPy- β -HpImPy- γ -HpPyPy- β -ImPy
	1539 β) 5'-W G C T T G G W-3'	ImPy- β -HpImIm- γ -PyPyPy- β -ImPy
15	1540 β) 5'-W G C T T G C W-3'	ImPy- β -HpImPy- γ -ImPyPy- β -ImPy
	1541 β) 5'-W G C T T C T W-3'	ImPy- β -HpPyHp- γ -PyImPy- β -ImPy
	1542 β) 5'-W G C T T C A W-3'	ImPy- β -HpPyPy- γ -HpImPy- β -ImPy
	1543 β) 5'-W G C T T C G W-3'	ImPy- β -HpPyIm- γ -PyImPy- β -ImPy
	1544 β) 5'-W G C T T C C W-3'	ImPy- β -HpPyPy- γ -ImImPy- β -ImPy
20	1545 β) 5'-W G C T A T T W-3'	ImPy- β -PyHpHp- γ -PyPyHp- β -ImPy
	1546 β) 5'-W G C T A T A W-3'	ImPy- β -PyHpPy- γ -HpPyHp- β -ImPy
	1547 β) 5'-W G C T A T G W-3'	ImPy- β -PyHpIm- γ -PyPyHp- β -ImPy
	1548 β) 5'-W G C T A T C W-3'	ImPy- β -PyHpPy- γ -ImPyHp- β -ImPy
	1549 β) 5'-W G C T A A T W-3'	ImPy- β -PyPyHp- γ -PyHpHp- β -ImPy
25	1550 β) 5'-W G C T A A A W-3'	ImPy- β -PyPyPy- γ -HpHpHp- β -ImPy
	1551 β) 5'-W G C T A A G W-3'	ImPy- β -PyPyIm- γ -PyHpHp- β -ImPy
	1552 β) 5'-W G C T A A C W-3'	ImPy- β -PyPyPy- γ -ImHpHp- β -ImPy
	1553 β) 5'-W G C T A G T W-3'	ImPy- β -PyImHp- γ -PyPyHp- β -ImPy
	1554 β) 5'-W G C T A G A W-3'	ImPy- β -PyImPy- γ -HpPyHp- β -ImPy
30	1555 β) 5'-W G C T A G G W-3'	ImPy- β -PyImIm- γ -PyPyHp- β -ImPy
	1556 β) 5'-W G C T A G C W-3'	ImPy- β -PyImPy- γ -ImPyHp- β -ImPy
	1557 β) 5'-W G C T A C T W-3'	ImPy- β -PyPyHp- γ -PyImHp- β -ImPy
	1558 β) 5'-W G C T A C A W-3'	ImPy- β -PyPyPy- γ -HpImHp- β -ImPy
	1559 β) 5'-W G C T A C G W-3'	ImPy- β -PyPyIm- γ -PyImHp- β -ImPy
35	1560 β) 5'-W G C T A C C W-3'	ImPy- β -PyPyPy- γ -ImImHp- β -ImPy

TABLE 159: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGCTSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1561 β) 5'-W G C T G T T W-3'	ImPy- β -ImHpHp- γ -PyPyPy- β -ImPy
	1562 β) 5'-W G C T G T A W-3'	ImPy- β -ImHpPy- γ -HpPyPy- β -ImPy
	1563 β) 5'-W G C T G T G W-3'	ImPy- β -ImHpIm- γ -PyPyPy- β -ImPy
10	1564 β) 5'-W G C T G T C W-3'	ImPy- β -ImHpPy- γ -ImPyPy- β -ImPy
	1565 β) 5'-W G C T G A T W-3'	ImPy- β -ImPyHp- γ -PyHpPy- β -ImPy
	1566 β) 5'-W G C T G A A W-3'	ImPy- β -ImPyPy- γ -HpHpPy- β -ImPy
15	1567 β) 5'-W G C T G A G W-3'	ImPy- β -ImPyIm- γ -PyHpPy- β -ImPy
	1568 β) 5'-W G C T G A C W-3'	ImPy- β -ImPyPy- γ -ImHpPy- β -ImPy
	1569 β) 5'-W G C T G G T W-3'	ImPy- β -ImImHp- γ -PyPyPy- β -ImPy
	1570 β) 5'-W G C T G G A W-3'	ImPy- β -ImImPy- γ -HpPyPy- β -ImPy
20	1571 β) 5'-W G C T G C T W-3'	ImPy- β -ImPyHp- γ -PyImPy- β -ImPy
	1572 β) 5'-W G C T G C A W-3'	ImPy- β -ImPyPy- γ -HpImPy- β -ImPy
	1573 β) 5'-W G C T G G G W-3'	ImPy- β -ImImIm- γ -PyPyPy- β -ImPy
	1574 β) 5'-W G C T G G C W-3'	ImPy- β -ImImPy- γ -ImPyPy- β -ImPy
25	1575 β) 5'-W G C T G C G W-3'	ImPy- β -ImPyIm- γ -PyImPy- β -ImPy
	1576 β) 5'-W G C T G C C W-3'	ImPy- β -ImPyPy- γ -ImImPy- β -ImPy
	1577 β) 5'-W G C T C T T W-3'	ImPy- β -PyHpHp- γ -PyPyIm- β -ImPy
	1578 β) 5'-W G C T C T A W-3'	ImPy- β -PyHpPy- γ -HpPyIm- β -ImPy
	1579 β) 5'-W G C T C T G W-3'	ImPy- β -PyHpIm- γ -PyPyIm- β -ImPy
30	1580 β) 5'-W G C T C T C W-3'	ImPy- β -PyHpPy- γ -ImPyIm- β -ImPy
	1581 β) 5'-W G C T C A T W-3'	ImPy- β -PyPyHp- γ -PyHpIm- β -ImPy
	1582 β) 5'-W G C T C A A W-3'	ImPy- β -PyPyPy- γ -HpHpIm- β -ImPy
	1583 β) 5'-W G C T C A G W-3'	ImPy- β -PyPyIm- γ -PyHpIm- β -ImPy
	1584 β) 5'-W G C T C A C W-3'	ImPy- β -PyPyPy- γ -ImHpIm- β -ImPy
	1585 β) 5'-W G C T C G T W-3'	ImPy- β -PyImHp- γ -PyPyIm- β -ImPy
	1586 β) 5'-W G C T C G A W-3'	ImPy- β -PyImPy- γ -HpPyIm- β -ImPy
35	1587 β) 5'-W G C T C C T W-3'	ImPy- β -PyPyHp- γ -PyImIm- β -ImPy
	1588 β) 5'-W G C T C C A W-3'	ImPy- β -PyPyPy- γ -HpImIm- β -ImPy
	1589 β) 5'-W G C T C G G W-3'	ImPy- β -PyImIm- γ -PyPyIm- β -ImPy
	1590 β) 5'-W G C T C G C W-3'	ImPy- β -PyImPy- γ -ImPyIm- β -ImPy
	1591 β) 5'-W G C T C C G W-3'	ImPy- β -PyPyIm- γ -PyImIm- β -ImPy
	1592 β) 5'-W G C T C C C W-3'	ImPy- β -PyPyPy- γ -ImImIm- β -ImPy

TABLE 160: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGCAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1593 β) 5'-W G C A T T T W-3'	ImPy- β -HpHpHp- γ -PyPyPy- β -ImPy
	1594 β) 5'-W G C A T T A W-3'	ImPy- β -HpHpPy- γ -HpPyPy- β -ImPy
	1595 β) 5'-W G C A T T G W-3'	ImPy- β -HpHpIm- γ -PyPyPy- β -ImPy
	1596 β) 5'-W G C A T T C W-3'	ImPy- β -HpHpPy- γ -ImPyPy- β -ImPy
	1597 β) 5'-W G C A T A T W-3'	ImPy- β -HpPyHp- γ -PyHpPy- β -ImPy
10	1598 β) 5'-W G C A T A A W-3'	ImPy- β -HpPyPy- γ -HpHpPy- β -ImPy
	1599 β) 5'-W G C A T A G W-3'	ImPy- β -HpPyIm- γ -PyHpPy- β -ImPy
	1600 β) 5'-W G C A T A C W-3'	ImPy- β -HpPyPy- γ -ImHpPy- β -ImPy
	1601 β) 5'-W G C A T G T W-3'	ImPy- β -HpImHp- γ -PyPyPy- β -ImPy
	1602 β) 5'-W G C A T G A W-3'	ImPy- β -HpImPy- γ -HpPyPy- β -ImPy
	1603 β) 5'-W G C A T G G W-3'	ImPy- β -HpImIm- γ -PyPyPy- β -ImPy
15	1604 β) 5'-W G C A T G C W-3'	ImPy- β -HpImPy- γ -ImPyPy- β -ImPy
	1605 β) 5'-W G C A T C T W-3'	ImPy- β -HpPyHp- γ -PyImPy- β -ImPy
	1606 β) 5'-W G C A T C A W-3'	ImPy- β -HpPyPy- γ -HpImPy- β -ImPy
	1607 β) 5'-W G C A T C G W-3'	ImPy- β -HpPyIm- γ -PyImPy- β -ImPy
	1608 β) 5'-W G C A T C C W-3'	ImPy- β -HpPyPy- γ -ImImPy- β -ImPy
20	1609 β) 5'-W G C A A T T W-3'	ImPy- β -PyHpHp- γ -PyPyHp- β -ImPy
	1610 β) 5'-W G C A A T A W-3'	ImPy- β -PyHpPy- γ -HpPyHp- β -ImPy
	1611 β) 5'-W G C A A T G W-3'	ImPy- β -PyHpIm- γ -PyPyHp- β -ImPy
	1612 β) 5'-W G C A A T C W-3'	ImPy- β -PyHpPy- γ -ImPyHp- β -ImPy
	1613 β) 5'-W G C A A A T W-3'	ImPy- β -PyPyHp- γ -PyHpHp- β -ImPy
25	1614 β) 5'-W G C A A A A W-3'	ImPy- β -PyPyPy- γ -HpHpHp- β -ImPy
	1615 β) 5'-W G C A A A G W-3'	ImPy- β -PyPyIm- γ -PyHpHp- β -ImPy
	1616 β) 5'-W G C A A A C W-3'	ImPy- β -PyPyPy- γ -ImHpHp- β -ImPy
	1617 β) 5'-W G C A A G T W-3'	ImPy- β -PyImHp- γ -PyPyHp- β -ImPy
	1618 β) 5'-W G C A A G A W-3'	ImPy- β -PyImPy- γ -HpPyHp- β -ImPy
30	1619 β) 5'-W G C A A G G W-3'	ImPy- β -PyImIm- γ -PyPyHp- β -ImPy
	1620 β) 5'-W G C A A G C W-3'	ImPy- β -PyImPy- γ -ImPyHp- β -ImPy
	1621 β) 5'-W G C A A C T W-3'	ImPy- β -PyPyHp- γ -PyImHp- β -ImPy
	1622 β) 5'-W G C A A C A W-3'	ImPy- β -PyPyPy- γ -HpImHp- β -ImPy
	1623 β) 5'-W G C A A C G W-3'	ImPy- β -PyPyIm- γ -PyImHp- β -ImPy
35	1624 β) 5'-W G C A A C C W-3'	ImPy- β -PyPyPy- γ -ImImHp- β -ImPy

TABLE 161: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGCASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1625 β) 5'-W G C A G T T W-3'	ImPy- β -ImHpH γ -PyPyPy- β -ImPy
	1626 β) 5'-W G C A G T A W-3'	ImPy- β -ImHpPy- γ -H β PyPy- β -ImPy
	1627 β) 5'-W G C A G T G W-3'	ImPy- β -ImHpIm- γ -PyPyPy- β -ImPy
	1628 β) 5'-W G C A G T C W-3'	ImPy- β -ImHpPy- γ -ImPyPy- β -ImPy
	1629 β) 5'-W G C A G A T W-3'	ImPy- β -ImPyH β - γ -PyH β Py- β -ImPy
10	1630 β) 5'-W G C A G A A W-3'	ImPy- β -ImPyPy- γ -H β H β Py- β -ImPy
	1631 β) 5'-W G C A G A G W-3'	ImPy- β -ImPyIm- γ -PyH β Py- β -ImPy
	1632 β) 5'-W G C A G A C W-3'	ImPy- β -ImPyPy- γ -ImH β Py- β -ImPy
	1633 β) 5'-W G C A G G T W-3'	ImPy- β -ImImH β - γ -PyPyPy- β -ImPy
	1634 β) 5'-W G C A G G A W-3'	ImPy- β -ImImPy- γ -H β PyPy- β -ImPy
15	1635 β) 5'-W G C A G C T W-3'	ImPy- β -ImPyH β - γ -PyImPy- β -ImPy
	1636 β) 5'-W G C A G C A W-3'	ImPy- β -ImPyPy- γ -H β ImPy- β -ImPy
	1637 β) 5'-W G C A G G G W-3'	ImPy- β -ImImIm- γ -PyPyPy- β -ImPy
	1638 β) 5'-W G C A G G C W-3'	ImPy- β -ImImPy- γ -ImPyPy- β -ImPy
	1639 β) 5'-W G C A G C G W-3'	ImPy- β -ImPyIm- γ -PyImPy- β -ImPy
20	1640 β) 5'-W G C A G C C W-3'	ImPy- β -ImPyPy- γ -ImImPy- β -ImPy
	1641 β) 5'-W G C A C T T W-3'	ImPy- β -PyH β Py- γ -PyPyIm- β -ImPy
	1642 β) 5'-W G C A C T A W-3'	ImPy- β -PyH β Py- γ -H β PyIm- β -ImPy
	1643 β) 5'-W G C A C T G W-3'	ImPy- β -PyH β Im- γ -PyPyIm- β -ImPy
	1644 β) 5'-W G C A C T C W-3'	ImPy- β -PyH β Py- γ -ImPyIm- β -ImPy
	1645 β) 5'-W G C A C A T W-3'	ImPy- β -PyH β Py- γ -H β PyIm- β -ImPy
25	1646 β) 5'-W G C A C A A W-3'	ImPy- β -PyPyPy- γ -H β H β Im- β -ImPy
	1647 β) 5'-W G C A C A G W-3'	ImPy- β -PyPyIm- γ -PyH β Im- β -ImPy
	1648 β) 5'-W G C A C A C W-3'	ImPy- β -PyPyPy- γ -ImH β Im- β -ImPy
	1649 β) 5'-W G C A C G T W-3'	ImPy- β -PyImH β - γ -PyPyIm- β -ImPy
	1650 β) 5'-W G C A C G A W-3'	ImPy- β -PyImPy- γ -H β PyIm- β -ImPy
30	1651 β) 5'-W G C A C C T W-3'	ImPy- β -PyPyH β - γ -PyImIm- β -ImPy
	1652 β) 5'-W G C A C C A W-3'	ImPy- β -PyPyPy- γ -H β ImIm- β -ImPy
	1653 β) 5'-W G C A C G G W-3'	ImPy- β -PyImIm- γ -PyPyIm- β -ImPy
	1654 β) 5'-W G C A C G C W-3'	ImPy- β -PyImPy- γ -ImPyIm- β -ImPy
	1655 β) 5'-W G C A C C C G W-3'	ImPy- β -PyPyIm- γ -PyImIm- β -ImPy
35	1656 β) 5'-W G C A C C C W-3'	ImPy- β -PyPyPy- γ -ImImIm- β -ImPy

TABLE 162: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGCCWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1657 β) 5'-W G C C T T T W-3'	ImPyPy- β -HpHp- γ -PyPy- β -ImImPy
5	1658 β) 5'-W G C C T T A W-3'	ImPyPy- β -HpPy- γ -HpPy- β -ImImPy
	1659 β) 5'-W G C C T T G W-3'	ImPyPy- β -HpIm- γ -PyPy- β -ImImPy
	1660 β) 5'-W G C C T T C W-3'	ImPyPy- β -HpPy- γ -ImPy- β -ImImPy
	1661 β) 5'-W G C C T A T W-3'	ImPyPy- β -PyHp- γ -PyHp- β -ImImPy
	1662 β) 5'-W G C C T A A W-3'	ImPyPy- β -PyPy- γ -HpHp- β -ImImPy
10	1663 β) 5'-W G C C T A G W-3'	ImPyPy- β -PyIm- γ -PyHp- β -ImImPy
	1664 β) 5'-W G C C T A C W-3'	ImPyPy- β -PyPy- γ -ImHp- β -ImImPy
	1665 β) 5'-W G C C T G T W-3'	ImPyPy- β -ImHp- γ -PyPy- β -ImImPy
	1666 β) 5'-W G C C T G A W-3'	ImPyPy- β -ImPy- γ -HpPy- β -ImImPy
	1667 β) 5'-W G C C T G G W-3'	ImPyPy- β -ImIm- γ -PyPy- β -ImImPy
15	1668 β) 5'-W G C C T G C W-3'	ImPyPy- β -ImPy- γ -ImPy- β -ImImPy
	1669 β) 5'-W G C C T C T W-3'	ImPyPy- β -PyHp- γ -PyIm- β -ImImPy
	1670 β) 5'-W G C C T C A W-3'	ImPyPy- β -PyPy- γ -HpIm- β -ImImPy
	1671 β) 5'-W G C C T C G W-3'	ImPyPy- β -PyIm- γ -PyIm- β -ImImPy
	1672 β) 5'-W G C C T C C W-3'	ImPyPy- β -PyPy- γ -ImIm- β -ImImPy
20	1673 β) 5'-W G C C A T T W-3'	ImPyPy- β -HpHp- γ -PyPy- β -ImImPy
	1674 β) 5'-W G C C A T A W-3'	ImPyPy- β -HpPy- γ -HpPy- β -ImImPy
	1675 β) 5'-W G C C A T G W-3'	ImPyPy- β -HpIm- γ -PyPy- β -ImImPy
	1676 β) 5'-W G C C A T C W-3'	ImPyPy- β -HpPy- γ -ImPy- β -ImImPy
	1677 β) 5'-W G C C A A T W-3'	ImPyPy- β -PyHp- γ -PyHp- β -ImImPy
25	1678 β) 5'-W G C C A A A W-3'	ImPyPy- β -PyPy- γ -HpHp- β -ImImPy
	1679 β) 5'-W G C C A A G W-3'	ImPyPy- β -PyIm- γ -PyHp- β -ImImPy
	1680 β) 5'-W G C C A A C W-3'	ImPyPy- β -PyPy- γ -ImHp- β -ImImPy
	1681 β) 5'-W G C C A G T W-3'	ImPyPy- β -ImHp- γ -PyPy- β -ImImPy
	1682 β) 5'-W G C C A G A W-3'	ImPyPy- β -ImPy- γ -HpPy- β -ImImPy
30	1683 β) 5'-W G C C A G G W-3'	ImPyPy- β -ImIm- γ -PyPy- β -ImImPy
	1684 β) 5'-W G C C A G C W-3'	ImPyPy- β -ImPy- γ -ImPy- β -ImImPy
	1685 β) 5'-W G C C A C T W-3'	ImPyPy- β -PyHp- γ -PyIm- β -ImImPy
	1686 β) 5'-W G C C A C A W-3'	ImPyPy- β -PyPy- γ -HpIm- β -ImImPy
	1687 β) 5'-W G C C A C G W-3'	ImPyPy- β -PyIm- γ -PyIm- β -ImImPy
35	1688 β) 5'-W G C C A C C W-3'	ImPyPy- β -PyPy- γ -ImIm- β -ImImPy

TABLE 163: 12-ring β-Hairpin Polyamides for recognition of 8-bp 5'-WGCCSNW-3'

	DNA sequence	aromatic amino acid sequence
5	1689β) 5'-W G C C G T T W-3'	ImPy-β-ImHpHp-γ-PyPy-β-ImImPy
	1690β) 5'-W G C C G T A W-3'	ImPy-β-ImHpPy-γ-HpPy-β-ImImPy
	1691β) 5'-W G C C G T G W-3'	ImPy-β-ImHpIm-γ-PyPy-β-ImImPy
	1692β) 5'-W G C C G T C W-3'	ImPy-β-ImHpPy-γ-ImPy-β-ImImPy
	1693β) 5'-W G C C G A T W-3'	ImPy-β-ImPyHp-γ-PyHp-β-ImImPy
	1694β) 5'-W G C C G A A W-3'	ImPy-β-ImPyPy-γ-HpHp-β-ImImPy
10	1695β) 5'-W G C C G A G W-3'	ImPy-β-ImPyIm-γ-PyHp-β-ImImPy
	1696β) 5'-W G C C G A C W-3'	ImPy-β-ImPyPy-γ-ImHp-β-ImImPy
	1697β) 5'-W G C C G G T W-3'	ImPy-β-ImImHp-γ-PyPy-β-ImImPy
	1698β) 5'-W G C C G G A W-3'	ImPy-β-ImImPy-γ-HpPy-β-ImImPy
	1699β) 5'-W G C C G C T W-3'	ImPy-β-ImPyHp-γ-PyIm-β-ImImPy
15	1700β) 5'-W G C C G C A W-3'	ImPy-β-ImPyPy-γ-HpIm-β-ImImPy
	1701β) 5'-W G C C C T T W-3'	ImPy-β-PyHpHp-γ-Py-β-ImImPy
	1702β) 5'-W G C C C T A W-3'	ImPy-β-PyHpPy-γ-Hp-β-ImImPy
	1703β) 5'-W G C C C T G W-3'	ImPy-β-PyHpIm-γ-Py-β-ImImPy
	1704β) 5'-W G C C C T C W-3'	ImPy-β-PyHpPy-γ-Im-β-ImImPy
20	1705β) 5'-W G C C C A T W-3'	ImPy-β-PyPyHp-γ-Py-β-ImImPy
	1706β) 5'-W G C C C A A W-3'	ImPy-β-PyPyPy-γ-Hp-β-ImImPy
	1707β) 5'-W G C C C A G W-3'	ImPy-β-PyPyIm-γ-Py-β-ImImPy
	1708β) 5'-W G C C C A C W-3'	ImPy-β-PyPyPy-γ-Im-β-ImImPy
	1709β) 5'-W G C C C G T W-3'	ImPy-β-PyImHp-γ-Py-β-ImImPy
25	1710β) 5'-W G C C C G A W-3'	ImPy-β-PyImPy-γ-Hp-β-ImImPy
	G73β) 5'-W G C C G G G W-3'	ImPy-β-ImImIm-γ-PyPy-β-ImImPy
	G74β) 5'-W G C C G G C W-3'	ImPy-β-ImImPy-γ-ImPy-β-ImImPy
	G75β) 5'-W G C C G C G W-3'	ImPy-β-ImPyIm-γ-PyIm-β-ImImPy
	G76β) 5'-W G C C G C C W-3'	ImPy-β-ImPyPy-γ-ImIm-β-ImImPy
30	G77β) 5'-W G C C C G G W-3'	ImPy-β-PyImIm-γ-Py-β-ImImPy
	G78β) 5'-W G C C C G C W-3'	ImPy-β-PyImPy-γ-Im-β-ImImPy

TABLE 164: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGAGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1713 β) 5'-W G A G T T T W-3'	Im- β -ImHpHpHp- γ -PyPyPyPy- β -Py
	1714 β) 5'-W G A G T T T A W-3'	Im- β -ImHpHpPy- γ -HpPyPyPy- β -Py
5	1715 β) 5'-W G A G T T G W-3'	Im- β -ImHpHpIm- γ -PyPyPyPy- β -Py
	1716 β) 5'-W G A G T T C W-3'	Im- β -ImHpHpPy- γ -ImPyPyPy- β -Py
	1717 β) 5'-W G A G T A T W-3'	Im- β -ImHpPyHp- γ -PyHpPyPy- β -Py
	1718 β) 5'-W G A G T A A W-3'	Im- β -ImHpPyPy- γ -HpHpPyPy- β -Py
	1719 β) 5'-W G A G T A G W-3'	Im- β -ImHpPyIm- γ -PyHpPyPy- β -Py
10	1720 β) 5'-W G A G T A C W-3'	Im- β -ImHpPyPy- γ -ImHpPyPy- β -Py
	1721 β) 5'-W G A G T G T W-3'	Im- β -ImHpImHp- γ -PyPyPyPy- β -Py
	1722 β) 5'-W G A G T G A W-3'	Im- β -ImHpImPy- γ -HpPyPyPy- β -Py
	1723 β) 5'-W G A G T G G W-3'	Im- β -ImHpImIm- γ -PyPyPyPy- β -Py
	1724 β) 5'-W G A G T G C W-3'	Im- β -ImHpImPy- γ -ImPyPyPy- β -Py
15	1725 β) 5'-W G A G T C T W-3'	Im- β -ImHpPyHp- γ -PyImPyPy- β -Py
	1726 β) 5'-W G A G T C A W-3'	Im- β -ImHpPyPy- γ -HpImPyPy- β -Py
	1727 β) 5'-W G A G T C G W-3'	Im- β -ImHpPyIm- γ -PyImPyPy- β -Py
	1728 β) 5'-W G A G T C C W-3'	Im- β -ImHpPyPy- γ -ImImPyPy- β -Py
	1729 β) 5'-W G A G A T T W-3'	Im- β -ImPyHpHp- γ -PyPyHpPy- β -Py
20	1730 β) 5'-W G A G A T A W-3'	Im- β -ImPyHpPy- γ -HpPyHpPy- β -Py
	1731 β) 5'-W G A G A T G W-3'	Im- β -ImPyHpIm- γ -PyPyHpPy- β -Py
	1732 β) 5'-W G A G A T C W-3'	Im- β -ImPyHpPy- γ -ImPyHpPy- β -Py
	1733 β) 5'-W G A G A A T W-3'	Im- β -ImPyPyHp- γ -PyHpHpPy- β -Py
	1734 β) 5'-W G A G A A A W-3'	Im- β -ImPyPyPy- γ -HpHpHpPy- β -Py
25	1735 β) 5'-W G A G A A G W-3'	Im- β -ImPyPyIm- γ -PyHpHpPy- β -Py
	1736 β) 5'-W G A G A A C W-3'	Im- β -ImPyPyPy- γ -ImHpHpPy- β -Py
	1737 β) 5'-W G A G A G T W-3'	Im- β -ImPyImHp- γ -PyPyHpPy- β -Py
	1738 β) 5'-W G A G A G A W-3'	Im- β -ImPyImPy- γ -HpPyHpPy- β -Py
	1739 β) 5'-W G A G A G G W-3'	Im- β -ImPyImIm- γ -PyPyHpPy- β -Py
30	1740 β) 5'-W G A G A G C W-3'	Im- β -ImPyImPy- γ -ImPyHpPy- β -Py
	1741 β) 5'-W G A G A C T W-3'	Im- β -ImPyPyHp- γ -PyImHpPy- β -Py
	1742 β) 5'-W G A G A C A W-3'	Im- β -ImPyPyPy- γ -HpImHpPy- β -Py
	1743 β) 5'-W G A G A C G W-3'	Im- β -ImPyPyIm- γ -PyImHpPy- β -Py
	1744 β) 5'-W G A G A C C W-3'	Im- β -ImPyPyPy- γ -ImImHpPy- β -Py

TABLE 165: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGAGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1745 β) 5'-W G A G G T T W-3'	Im- β -ImImH _p H _p - γ -PyPyPyPy- β -Py
	1746 β) 5'-W G A G G T A W-3'	Im- β -ImImH _p Py- γ -H _p PyPyPy- β -Py
	1747 β) 5'-W G A G G T G W-3'	Im- β -ImImH _p Im- γ -PyPyPyPy- β -Py
	1748 β) 5'-W G A G G T C W-3'	Im- β -ImImH _p Py- γ -ImPyPyPy- β -Py
	1749 β) 5'-W G A G G A T W-3'	Im- β -ImImPyH _p - γ -PyH _p PyPy- β -Py
10	1750 β) 5'-W G A G G A A W-3'	Im- β -ImImPyPy- γ -H _p H _p PyPy- β -Py
	1751 β) 5'-W G A G G A G W-3'	Im- β -ImImPyIm- γ -PyH _p PyPy- β -Py
	1752 β) 5'-W G A G G A C W-3'	Im- β -ImImPyPy- γ -ImH _p PyPy- β -Py
	1753 β) 5'-W G A G G G T W-3'	Im- β -ImImImH _p - γ -PyPyPyPy- β -Py
	1754 β) 5'-W G A G G G A W-3'	Im- β -ImImImPy- γ -H _p PyPyPy- β -Py
15	1755 β) 5'-W G A G G C T W-3'	Im- β -ImImPyH _p - γ -PyImPyPy- β -Py
	1756 β) 5'-W G A G G C A W-3'	Im- β -ImImPyPy- γ -H _p ImPyPy- β -Py
	1757 β) 5'-W G A G C T T W-3'	Im- β -ImPyH _p H _p - γ -PyPyImPy- β -Py
	1758 β) 5'-W G A G C T A W-3'	Im- β -ImPyH _p Py- γ -H _p PyImPy- β -Py
	1759 β) 5'-W G A G C T G W-3'	Im- β -ImPyH _p Im- γ -PyPyImPy- β -Py
20	1760 β) 5'-W G A G C T C W-3'	Im- β -ImPyH _p Py- γ -ImPyImPy- β -Py
	1761 β) 5'-W G A G C A T W-3'	Im- β -ImPyPyH _p - γ -PyH _p ImPy- β -Py
	1762 β) 5'-W G A G C A A W-3'	Im- β -ImPyPyPy- γ -H _p H _p ImPy- β -Py
	1763 β) 5'-W G A G C A G W-3'	Im- β -ImPyPyIm- γ -PyH _p ImPy- β -Py
	1764 β) 5'-W G A G C A C W-3'	Im- β -ImPyPyPy- γ -ImH _p ImPy- β -Py
25	1765 β) 5'-W G A G C G T W-3'	Im- β -ImPyImH _p - γ -PyPyImPy- β -Py
	1766 β) 5'-W G A G C G A W-3'	Im- β -ImPyImPy- γ -H _p PyImPy- β -Py
	1767 β) 5'-W G A G C C T W-3'	Im- β -ImPyPyH _p - γ -PyImImPy- β -Py
	1768 β) 5'-W G A G C C A W-3'	Im- β -ImPyPyPy- γ -H _p ImImPy- β -Py
	1769 β) 5'-W G A G G G G W-3'	Im- β -ImImImIm- γ -PyPyPyPy- β -Py
30	1770 β) 5'-W G A G G G C W-3'	Im- β -ImImImPy- γ -ImPyPyPy- β -Py
	1771 β) 5'-W G A G G C G W-3'	Im- β -ImImPyIm- γ -PyImPyPy- β -Py
	1772 β) 5'-W G A G G C C W-3'	Im- β -ImImPyPy- γ -ImImPyPy- β -Py
	1773 β) 5'-W G A G C G G W-3'	Im- β -ImPyImIm- γ -PyPyImPy- β -Py
	1774 β) 5'-W G A G C G C W-3'	Im- β -ImPyImPy- γ -ImPyImPy- β -Py
35	1775 β) 5'-W G A G C C C G W-3'	Im- β -ImPyPyIm- γ -PyImImPy- β -Py
	1776 β) 5'-W G A G C C C W-3'	Im- β -ImPyPyPy- γ -ImImImPy- β -Py

TABLE 166: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGATWNW-3'

	DNA sequence	aromatic amino acid sequence
5	1777 β) 5'-W G A T T T T W-3'	ImPy- β -HpHpHp- γ -PyPyPy- β -HpPy
	1778 β) 5'-W G A T T T A W-3'	ImPy- β -HpHpPy- γ -HpPyPy- β -HpPy
	1779 β) 5'-W G A T T T G W-3'	ImPy- β -HpHpIm- γ -PyPyPy- β -HpPy
	1780 β) 5'-W G A T T T C W-3'	ImPy- β -HpHpPy- γ -ImPyPy- β -HpPy
	1781 β) 5'-W G A T T A T W-3'	ImPy- β -HpPyHp- γ -PyHpPy- β -HpPy
10	1782 β) 5'-W G A T T A A W-3'	ImPy- β -HpPyPy- γ -HpHpPy- β -HpPy
	1783 β) 5'-W G A T T A G W-3'	ImPy- β -HpPyIm- γ -PyHpPy- β -HpPy
	1784 β) 5'-W G A T T A C W-3'	ImPy- β -HpPyPy- γ -ImHpPy- β -HpPy
	1785 β) 5'-W G A T T G T W-3'	ImPy- β -HpImHp- γ -PyPyPy- β -HpPy
	1786 β) 5'-W G A T T G A W-3'	ImPy- β -HpImPy- γ -HpPyPy- β -HpPy
	1787 β) 5'-W G A T T G G W-3'	ImPy- β -HpImIm- γ -PyPyPy- β -HpPy
15	1788 β) 5'-W G A T T G C W-3'	ImPy- β -HpImPy- γ -ImPyPy- β -HpPy
	1789 β) 5'-W G A T T C T W-3'	ImPy- β -HpPyHp- γ -PyImPy- β -HpPy
	1790 β) 5'-W G A T T C A W-3'	ImPy- β -HpPyPy- γ -HpImPy- β -HpPy
	1791 β) 5'-W G A T T C G W-3'	ImPy- β -HpPyIm- γ -PyImPy- β -HpPy
	1792 β) 5'-W G A T T C C W-3'	ImPy- β -HpPyPy- γ -ImImPy- β -HpPy
20	1793 β) 5'-W G A T A T T W-3'	ImPy- β -PyHpHp- γ -PyPyHp- β -HpPy
	1794 β) 5'-W G A T A T A W-3'	ImPy- β -PyHpPy- γ -HpPyHp- β -HpPy
	1795 β) 5'-W G A T A T G W-3'	ImPy- β -PyHpIm- γ -PyPyHp- β -HpPy
	1796 β) 5'-W G A T A T C W-3'	ImPy- β -PyHpPy- γ -ImPyHp- β -HpPy
	1797 β) 5'-W G A T A A T W-3'	ImPy- β -PyPyHp- γ -PyHpHp- β -HpPy
25	1798 β) 5'-W G A T A A A W-3'	ImPy- β -PyPyPy- γ -HpHpHp- β -HpPy
	1799 β) 5'-W G A T A A G W-3'	ImPy- β -PyPyIm- γ -PyHpHp- β -HpPy
	1800 β) 5'-W G A T A A C W-3'	ImPy- β -PyPyPy- γ -ImHpHp- β -HpPy
	1801 β) 5'-W G A T A G T W-3'	ImPy- β -PyImHp- γ -PyPyHp- β -HpPy
	1802 β) 5'-W G A T A G A W-3'	ImPy- β -PyImPy- γ -HpPyHp- β -HpPy
30	1803 β) 5'-W G A T A G G W-3'	ImPy- β -PyImIm- γ -PyPyHp- β -HpPy
	1804 β) 5'-W G A T A G C W-3'	ImPy- β -PyImPy- γ -ImPyHp- β -HpPy
	1805 β) 5'-W G A T A C T W-3'	ImPy- β -PyPyHp- γ -PyImHp- β -HpPy
	1806 β) 5'-W G A T A C A W-3'	ImPy- β -PyPyPy- γ -HpImHp- β -HpPy
	1807 β) 5'-W G A T A C G W-3'	ImPy- β -PyPyIm- γ -PyImHp- β -HpPy
35	1808 β) 5'-W G A T A C C W-3'	ImPy- β -PyPyPy- γ -ImImHp- β -HpPy

TABLE 167: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGATSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1809 β) 5'-W G A T G T T W-3'	ImPy- β -ImHpHp- γ -PyPyPy- β -HpPy
	1810 β) 5'-W G A T G T A W-3'	ImPy- β -ImHpPy- γ -HpPyPy- β -HpPy
	1811 β) 5'-W G A T G T G W-3'	ImPy- β -ImHpIm- γ -PyPyPy- β -HpPy
	1812 β) 5'-W G A T G T C W-3'	ImPy- β -ImHpPy- γ -ImPyPy- β -HpPy
	1813 β) 5'-W G A T G A T W-3'	ImPy- β -ImPyHp- γ -PyHpPy- β -HpPy
10	1814 β) 5'-W G A T G A A W-3'	ImPy- β -ImPyPy- γ -HpHpPy- β -HpPy
	1815 β) 5'-W G A T G A G W-3'	ImPy- β -ImPyIm- γ -PyHpPy- β -HpPy
	1816 β) 5'-W G A T G A C W-3'	ImPy- β -ImPyPy- γ -ImHpPy- β -HpPy
	1817 β) 5'-W G A T G G T W-3'	ImPy- β -ImImHp- γ -PyPyPy- β -HpPy
	1818 β) 5'-W G A T G G A W-3'	ImPy- β -ImImPy- γ -HpPyPy- β -HpPy
	1819 β) 5'-W G A T G C T W-3'	ImPy- β -ImPyHp- γ -PyImPy- β -HpPy
15	1820 β) 5'-W G A T G C A W-3'	ImPy- β -ImPyPy- γ -HpImPy- β -HpPy
	1821 β) 5'-W G A T G G G W-3'	ImPy- β -ImImIm- γ -PyPyPy- β -HpPy
	1822 β) 5'-W G A T G G C W-3'	ImPy- β -ImImPy- γ -ImPyPy- β -HpPy
	1823 β) 5'-W G A T G C G W-3'	ImPy- β -ImPyIm- γ -PyImPy- β -HpPy
	1824 β) 5'-W G A T G C C W-3'	ImPy- β -ImPyPy- γ -ImImPy- β -HpPy
20	1825 β) 5'-W G A T C T T W-3'	ImPy- β -PyHpHp- γ -PyPyIm- β -HpPy
	1826 β) 5'-W G A T C T A W-3'	ImPy- β -PyHpPy- γ -HpPyIm- β -HpPy
	1827 β) 5'-W G A T C T G W-3'	ImPy- β -PyHpIm- γ -PyPyIm- β -HpPy
	1828 β) 5'-W G A T C T C W-3'	ImPy- β -PyHpPy- γ -ImPyIm- β -HpPy
	1829 β) 5'-W G A T C A T W-3'	ImPy- β -PyPyHp- γ -PyHpIm- β -HpPy
25	1830 β) 5'-W G A T C A A W-3'	ImPy- β -PyPyPy- γ -HpHpIm- β -HpPy
	1831 β) 5'-W G A T C A G W-3'	ImPy- β -PyPyIm- γ -PyHpIm- β -HpPy
	1832 β) 5'-W G A T C A C W-3'	ImPy- β -PyPyPy- γ -ImHpIm- β -HpPy
	1833 β) 5'-W G A T C G T W-3'	ImPy- β -PyImHp- γ -PyPyIm- β -HpPy
	1834 β) 5'-W G A T C G A W-3'	ImPy- β -PyImPy- γ -HpPyIm- β -HpPy
30	1835 β) 5'-W G A T C C T W-3'	ImPy- β -PyPyHp- γ -PyImIm- β -HpPy
	1836 β) 5'-W G A T C C A W-3'	ImPy- β -PyPyPy- γ -HpImIm- β -HpPy
	1837 β) 5'-W G A T C G G W-3'	ImPy- β -PyImIm- γ -PyPyIm- β -HpPy
	1838 β) 5'-W G A T C G C W-3'	ImPy- β -PyImPy- γ -ImPyIm- β -HpPy
	1839 β) 5'-W G A T C C G W-3'	ImPy- β -PyPyIm- γ -PyImIm- β -HpPy
35	1840 β) 5'-W G A T C C C W-3'	ImPy- β -PyPyPy- γ -ImImIm- β -HpPy

TABLE 168: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGAAWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1841 β) 5'-W G A A T T T W-3'	ImPy- β -HpHpHp- γ -PyPyPy- β -HpPy
	1842 β) 5'-W G A A T T A W-3'	ImPy- β -HpHpPy- γ -HpPyPy- β -HpPy
	1843 β) 5'-W G A A T T G W-3'	ImPy- β -HpHpIm- γ -PyPyPy- β -HpPy
	1844 β) 5'-W G A A T T C W-3'	ImPy- β -HpHpPy- γ -ImPyPy- β -HpPy
	1845 β) 5'-W G A A T A T W-3'	ImPy- β -HpPyHp- γ -PyHpPy- β -HpPy
10	1846 β) 5'-W G A A T A A W-3'	ImPy- β -HpPyPy- γ -HpHpPy- β -HpPy
	1847 β) 5'-W G A A T A G W-3'	ImPy- β -HpPyIm- γ -PyHpPy- β -HpPy
	1848 β) 5'-W G A A T A C W-3'	ImPy- β -HpPyPy- γ -ImHpPy- β -HpPy
	1849 β) 5'-W G A A T G T W-3'	ImPy- β -HpImHp- γ -PyPyPy- β -HpPy
	1850 β) 5'-W G A A T G A W-3'	ImPy- β -HpImPy- γ -HpPyPy- β -HpPy
	1851 β) 5'-W G A A T G G W-3'	ImPy- β -HpImIm- γ -PyPyPy- β -HpPy
15	1852 β) 5'-W G A A T G C W-3'	ImPy- β -HpImPy- γ -ImPyPy- β -HpPy
	1853 β) 5'-W G A A T C T W-3'	ImPy- β -HpPyHp- γ -PyImPy- β -HpPy
	1854 β) 5'-W G A A T C A W-3'	ImPy- β -HpPyPy- γ -HpImPy- β -HpPy
	1855 β) 5'-W G A A T C G W-3'	ImPy- β -HpPyIm- γ -PyImPy- β -HpPy
	1856 β) 5'-W G A A T C C W-3'	ImPy- β -HpPyPy- γ -ImImPy- β -HpPy
20	1857 β) 5'-W G A A A T T W-3'	ImPy- β -PyHpHp- γ -PyPyHp- β -HpPy
	1858 β) 5'-W G A A A T A W-3'	ImPy- β -PyHpPy- γ -HpPyHp- β -HpPy
	1869 β) 5'-W G A A A T G W-3'	ImPy- β -PyHpIm- γ -PyPyHp- β -HpPy
	1860 β) 5'-W G A A A T C W-3'	ImPy- β -PyHpPy- γ -ImPyHp- β -HpPy
	1861 β) 5'-W G A A A A T W-3'	ImPy- β -PyPyHp- γ -PyHpHp- β -HpPy
25	1862 β) 5'-W G A A A A W-3'	ImPy- β -PyPyPy- γ -HpHpHp- β -HpPy
	1863 β) 5'-W G A A A A G W-3'	ImPy- β -PyPyIm- γ -PyHpHp- β -HpPy
	1864 β) 5'-W G A A A A C W-3'	ImPy- β -PyPyPy- γ -ImHpHp- β -HpPy
	1865 β) 5'-W G A A A A G T W-3'	ImPy- β -PyImHp- γ -PyPyHp- β -HpPy
	1866 β) 5'-W G A A A A G A W-3'	ImPy- β -PyImPy- γ -HpPyHp- β -HpPy
30	1867 β) 5'-W G A A A G G W-3'	ImPy- β -PyImIm- γ -PyPyHp- β -HpPy
	1868 β) 5'-W G A A A G C W-3'	ImPy- β -PyImPy- γ -ImPyHp- β -HpPy
	1869 β) 5'-W G A A A C T W-3'	ImPy- β -PyPyHp- γ -PyImHp- β -HpPy
	1870 β) 5'-W G A A A C A W-3'	ImPy- β -PyPyPy- γ -HpImHp- β -HpPy
	1871 β) 5'-W G A A A C G W-3'	ImPy- β -PyPyIm- γ -PyImHp- β -HpPy
35	1872 β) 5'-W G A A A C C W-3'	ImPy- β -PyPyPy- γ -ImImHp- β -HpPy

TABLE 169: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGAASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1873 β) 5'-W G A A G T T W-3'	ImPy- β -ImHpHp- γ -PyPyPy- β -HpPy
	1874 β) 5'-W G A A G T A W-3'	ImPy- β -ImHpPy- γ -HpPyPy- β -HpPy
	1875 β) 5'-W G A A G T G W-3'	ImPy- β -ImHpIm- γ -PyPyPy- β -HpPy
10	1876 β) 5'-W G A A G T C W-3'	ImPy- β -ImHpPy- γ -ImPyPy- β -HpPy
	1877 β) 5'-W G A A G A T W-3'	ImPy- β -ImPyHp- γ -PyHpPy- β -HpPy
	1878 β) 5'-W G A A G A A W-3'	ImPy- β -ImPyPy- γ -HpHpPy- β -HpPy
15	1879 β) 5'-W G A A G A G W-3'	ImPy- β -ImPyIm- γ -PyHpPy- β -HpPy
	1880 β) 5'-W G A A G A C W-3'	ImPy- β -ImPyPy- γ -ImHpPy- β -HpPy
	1881 β) 5'-W G A A G G T W-3'	ImPy- β -ImImHp- γ -PyPyPy- β -HpPy
	1882 β) 5'-W G A A G G A W-3'	ImPy- β -ImImPy- γ -HpPyPy- β -HpPy
20	1883 β) 5'-W G A A G C T W-3'	ImPy- β -ImPyHp- γ -PyImPy- β -HpPy
	1884 β) 5'-W G A A G C A W-3'	ImPy- β -ImPyPy- γ -HpImPy- β -HpPy
	1885 β) 5'-W G A A G G G W-3'	ImPy- β -ImImIm- γ -PyPyPy- β -HpPy
	1886 β) 5'-W G A A G G C W-3'	ImPy- β -ImImPy- γ -ImPyPy- β -HpPy
	1887 β) 5'-W G A A G C G W-3'	ImPy- β -ImPyIm- γ -PyImPy- β -HpPy
25	1888 β) 5'-W G A A G C C W-3'	ImPy- β -ImPyPy- γ -ImImPy- β -HpPy
	1889 β) 5'-W G A A C T T W-3'	ImPy- β -PyHpHp- γ -PyPyIm- β -HpPy
	1890 β) 5'-W G A A C T A W-3'	ImPy- β -PyHpPy- γ -HpPyIm- β -HpPy
	1891 β) 5'-W G A A C T G W-3'	ImPy- β -PyHpIm- γ -PyPyIm- β -HpPy
	1892 β) 5'-W G A A C T C W-3'	ImPy- β -PyHpPy- γ -ImPyIm- β -HpPy
30	1893 β) 5'-W G A A C A T W-3'	ImPy- β -PyPyHp- γ -PyHpIm- β -HpPy
	1894 β) 5'-W G A A C A A W-3'	ImPy- β -PyPyPy- γ -HpHpIm- β -HpPy
	1895 β) 5'-W G A A C A G W-3'	ImPy- β -PyPyIm- γ -PyHpIm- β -HpPy
	1896 β) 5'-W G A A C A C W-3'	ImPy- β -PyPyPy- γ -ImHpIm- β -HpPy
	1897 β) 5'-W G A A C G T W-3'	ImPy- β -PyImHp- γ -PyPyIm- β -HpPy
	1898 β) 5'-W G A A C G A W-3'	ImPy- β -PyImPy- γ -HpPyIm- β -HpPy
35	1899 β) 5'-W G A A C C T W-3'	ImPy- β -PyPyHp- γ -PyImIm- β -HpPy
	1900 β) 5'-W G A A C C A W-3'	ImPy- β -PyPyPy- γ -HpImIm- β -HpPy
	1901 β) 5'-W G A A C G G W-3'	ImPy- β -PyImIm- γ -PyPyIm- β -HpPy
	1902 β) 5'-W G A A C G C W-3'	ImPy- β -PyImPy- γ -ImPyIm- β -HpPy
	1903 β) 5'-W G A A C C G W-3'	ImPy- β -PyPyIm- γ -PyImIm- β -HpPy
	1904 β) 5'-W G A A C C C W-3'	ImPy- β -PyPyPy- γ -ImImIm- β -HpPy

TABLE 170: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGACWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1905 β) 5'-W G A C T T T T W-3'	ImPyPy- β -HpHp- γ -PyPy- β -ImHpPy
5	1906 β) 5'-W G A C T T T A W-3'	ImPyPy- β -HpPy- γ -HpPy- β -ImHpPy
	1907 β) 5'-W G A C T T G W-3'	ImPyPy- β -HpIm- γ -PyPy- β -ImHpPy
	1908 β) 5'-W G A C T T C W-3'	ImPyPy- β -HpPy- γ -ImPy- β -ImHpPy
	1909 β) 5'-W G A C T A T W-3'	ImPyPy- β -PyHp- γ -PyHp- β -ImHpPy
	1910 β) 5'-W G A C T A A W-3'	ImPyPy- β -PyPy- γ -HpHp- β -ImHpPy
10	1911 β) 5'-W G A C T A G W-3'	ImPyPy- β -PyIm- γ -PyHp- β -ImHpPy
	1912 β) 5'-W G A C T A C W-3'	ImPyPy- β -PyPy- γ -ImHp- β -ImHpPy
	1913 β) 5'-W G A C T G T W-3'	ImPyPy- β -ImHp- γ -PyPy- β -ImHpPy
	1914 β) 5'-W G A C T G A W-3'	ImPyPy- β -ImPy- γ -HpPy- β -ImHpPy
	1915 β) 5'-W G A C T G G W-3'	ImPyPy- β -ImIm- γ -PyPy- β -ImHpPy
15	1916 β) 5'-W G A C T G C W-3'	ImPyPy- β -ImPy- γ -ImPy- β -ImHpPy
	1917 β) 5'-W G A C T C T W-3'	ImPyPy- β -PyHp- γ -PyIm- β -ImHpPy
	1918 β) 5'-W G A C T C A W-3'	ImPyPy- β -PyPy- γ -HpIm- β -ImHpPy
	1919 β) 5'-W G A C T C G W-3'	ImPyPy- β -PyIm- γ -PyIm- β -ImHpPy
	1920 β) 5'-W G A C T C C W-3'	ImPyPy- β -PyPy- γ -ImIm- β -ImHpPy
20	1921 β) 5'-W G A C A T T W-3'	ImPyPy- β -HpHp- γ -PyPy- β -ImHpPy
	1922 β) 5'-W G A C A T A W-3'	ImPyPy- β -HpPy- γ -HpPy- β -ImHpPy
	1923 β) 5'-W G A C A T G W-3'	ImPyPy- β -HpIm- γ -PyPy- β -ImHpPy
	1924 β) 5'-W G A C A T C W-3'	ImPyPy- β -HpPy- γ -ImPy- β -ImHpPy
	1925 β) 5'-W G A C A A T W-3'	ImPyPy- β -PyHp- γ -PyHp- β -ImHpPy
25	1926 β) 5'-W G A C A A A W-3'	ImPyPy- β -PyPy- γ -HpHp- β -ImHpPy
	1927 β) 5'-W G A C A A G W-3'	ImPyPy- β -PyIm- γ -PyHp- β -ImHpPy
	1928 β) 5'-W G A C A A C W-3'	ImPyPy- β -PyPy- γ -ImHp- β -ImHpPy
	1929 β) 5'-W G A C A G T W-3'	ImPyPy- β -ImHp- γ -PyPy- β -ImHpPy
	1930 β) 5'-W G A C A G A W-3'	ImPyPy- β -ImPy- γ -HpPy- β -ImHpPy
30	1931 β) 5'-W G A C A G G W-3'	ImPyPy- β -ImIm- γ -PyPy- β -ImHpPy
	1932 β) 5'-W G A C A G C W-3'	ImPyPy- β -ImPy- γ -ImPy- β -ImHpPy
	1933 β) 5'-W G A C A C T W-3'	ImPyPy- β -PyHp- γ -PyIm- β -ImHpPy
	1934 β) 5'-W G A C A C A W-3'	ImPyPy- β -PyPy- γ -HpIm- β -ImHpPy
	1935 β) 5'-W G A C A C G W-3'	ImPyPy- β -PyIm- γ -PyIm- β -ImHpPy
35	1936 β) 5'-W G A C A C C W-3'	ImPyPy- β -PyPy- γ -ImIm- β -ImHpPy

TABLE 171: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGACSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	1937 β) 5'-W G A C G T T W-3'	ImPy- β -ImHpHp- γ -PyPy- β -ImHpPy
	1938 β) 5'-W G A C G T A W-3'	ImPy- β -ImHpPy- γ -HpPy- β -ImHpPy
	1939 β) 5'-W G A C G T G W-3'	ImPy- β -ImHpIm- γ -PyPy- β -ImHpPy
10	1940 β) 5'-W G A C G T C W-3'	ImPy- β -ImHpPy- γ -ImPy- β -ImHpPy
	1941 β) 5'-W G A C G A T W-3'	ImPy- β -ImPyHp- γ -PyHp- β -ImHpPy
	1942 β) 5'-W G A C G A A W-3'	ImPy- β -ImPyPy- γ -HpHp- β -ImHpPy
15	1943 β) 5'-W G A C G A G W-3'	ImPy- β -ImPyIm- γ -PyHp- β -ImHpPy
	1944 β) 5'-W G A C G A C W-3'	ImPy- β -ImPyPy- γ -ImHp- β -ImHpPy
	1945 β) 5'-W G A C G G T W-3'	ImPy- β -ImImHp- γ -PyPy- β -ImHpPy
	1946 β) 5'-W G A C G G A W-3'	ImPy- β -ImImPy- γ -HpPy- β -ImHpPy
20	1947 β) 5'-W G A C G C T W-3'	ImPy- β -ImPyHp- γ -PyIm- β -ImHpPy
	1948 β) 5'-W G A C G C A W-3'	ImPy- β -ImPyPy- γ -HpIm- β -ImHpPy
	1949 β) 5'-W G A C C T T W-3'	ImPy- β -PyHpHp- γ -Py- β -ImImHpPy
	1950 β) 5'-W G A C C T A W-3'	ImPy- β -PyHpPy- γ -Hp- β -ImImHpPy
25	1951 β) 5'-W G A C C T G W-3'	ImPy- β -PyHpIm- γ -Py- β -ImImHpPy
	1952 β) 5'-W G A C C T C W-3'	ImPy- β -PyHpPy- γ -Im- β -ImImHpPy
	1953 β) 5'-W G A C C A T W-3'	ImPy- β -PyPyHp- γ -Py- β -ImImHpPy
	1954 β) 5'-W G A C C A A W-3'	ImPy- β -PyPyPy- γ -Hp- β -ImImHpPy
	1955 β) 5'-W G A C C A G W-3'	ImPy- β -PyPyIm- γ -Py- β -ImImHpPy
	1956 β) 5'-W G A C C A C W-3'	ImPy- β -PyPyPy- γ -Im- β -ImImHpPy
	1957 β) 5'-W G A C C G T W-3'	ImPy- β -PyImHp- γ -Py- β -ImImHpPy
30	1958 β) 5'-W G A C C G A W-3'	ImPy- β -PyImPy- γ -Hp- β -ImImHpPy
	1959 β) 5'-W G A C C C T W-3'	ImPy- β -PyPyHp- γ -PyImIm- β -Py
	1960 β) 5'-W G A C C C A W-3'	ImPy- β -PyPyPy- γ -HpImIm- β -Py
	1961 β) 5'-W G A C G G G W-3'	ImPy- β -ImImIm- γ -PyPy- β -ImHpPy
	1962 β) 5'-W G A C G G C W-3'	ImPy- β -ImImPy- γ -ImPy- β -ImHpPy
35	1963 β) 5'-W G A C G C G W-3'	ImPy- β -ImPyIm- γ -PyIm- β -ImHpPy
	1964 β) 5'-W G A C G C C W-3'	ImPy- β -ImPyPy- γ -ImIm- β -ImHpPy
	1965 β) 5'-W G A C C G G W-3'	ImPy- β -PyImIm- γ -Py- β -ImImHpPy
	1966 β) 5'-W G A C C G C W-3'	ImPy- β -PyImPy- γ -Im- β -ImImHpPy
	1967 β) 5'-W G A C C C G W-3'	ImPy- β -PyPyIm- γ -PyImIm- β -Py
	1968 β) 5'-W G A C C C C W-3'	ImPy- β -PyPyPy- γ -ImImIm- β -Py

TABLE 172: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTGWNNW-3'

	DNA sequence	aromatic amino acid sequence
	1969 β) 5'-W G T G T T T W-3'	Im- β -ImHpHpHp- γ -PyPyPyPy- β -Py
5	1970 β) 5'-W G T G T T A W-3'	Im- β -ImHpHpPy- γ -HpPyPyPy- β -Py
	1971 β) 5'-W G T G T T G W-3'	Im- β -ImHpHpIm- γ -PyPyPyPy- β -Py
	1972 β) 5'-W G T G T T C W-3'	Im- β -ImHpHpPy- γ -ImPyPyPy- β -Py
	1973 β) 5'-W G T G T A T W-3'	Im- β -ImHpPyHp- γ -PyHpPyPy- β -Py
	1974 β) 5'-W G T G T A A W-3'	Im- β -ImHpPyPy- γ -HpHpPyPy- β -Py
10	1975 β) 5'-W G T G T A G W-3'	Im- β -ImHpPyIm- γ -PyHpPyPy- β -Py
	1976 β) 5'-W G T G T A C W-3'	Im- β -ImHpPyPy- γ -ImHpPyPy- β -Py
	1977 β) 5'-W G T G T G T W-3'	Im- β -ImHpImHp- γ -PyPyPyPy- β -Py
	1978 β) 5'-W G T G T G A W-3'	Im- β -ImHpImPy- γ -HpPyPyPy- β -Py
	1979 β) 5'-W G T G T G G W-3'	Im- β -ImHpImIm- γ -PyPyPyPy- β -Py
15	1980 β) 5'-W G T G T G C W-3'	Im- β -ImHpImPy- γ -ImPyPyPy- β -Py
	1981 β) 5'-W G T G T C T W-3'	Im- β -ImHpPyHp- γ -PyImPyPy- β -Py
	1982 β) 5'-W G T G T C A W-3'	Im- β -ImHpPyPy- γ -HpImPyPy- β -Py
	1983 β) 5'-W G T G T C G W-3'	Im- β -ImHpPyIm- γ -PyImPyPy- β -Py
	1984 β) 5'-W G T G T C C W-3'	Im- β -ImHpPyPy- γ -ImImPyPy- β -Py
20	1985 β) 5'-W G T G A T T W-3'	Im- β -ImPyHpHp- γ -PyPyHpPy- β -Py
	1986 β) 5'-W G T G A T A W-3'	Im- β -ImPyHpPy- γ -HpPyHpPy- β -Py
	1987 β) 5'-W G T G A T G W-3'	Im- β -ImPyHpIm- γ -PyPyHpPy- β -Py
	1988 β) 5'-W G T G A T C W-3'	Im- β -ImPyHpPy- γ -ImPyHpPy- β -Py
	1989 β) 5'-W G T G A A T W-3'	Im- β -ImPyPyHp- γ -PyHpHpPy- β -Py
25	1990 β) 5'-W G T G A A A W-3'	Im- β -ImPyPyPy- γ -HpHpHpPy- β -Py
	1991 β) 5'-W G T G A A G W-3'	Im- β -ImPyPyIm- γ -PyHpHpPy- β -Py
	1992 β) 5'-W G T G A A C W-3'	Im- β -ImPyPyPy- γ -ImHpHpPy- β -Py
	1993 β) 5'-W G T G A G T W-3'	Im- β -ImPyImHp- γ -PyPyHpPy- β -Py
	1994 β) 5'-W G T G A G A W-3'	Im- β -ImPyImPy- γ -HpPyHpPy- β -Py
30	1995 β) 5'-W G T G A G G W-3'	Im- β -ImPyImIm- γ -PyPyHpPy- β -Py
	1996 β) 5'-W G T G A G C W-3'	Im- β -ImPyImPy- γ -ImPyHpPy- β -Py
	1997 β) 5'-W G T G A C T W-3'	Im- β -ImPyPyHp- γ -PyImHpPy- β -Py
	1998 β) 5'-W G T G A C A W-3'	Im- β -ImPyPyPy- γ -HpImHpPy- β -Py
	1999 β) 5'-W G T G A C G W-3'	Im- β -ImPyPyIm- γ -PyImHpPy- β -Py
35	2000 β) 5'-W G T G A C C W-3'	Im- β -ImPyPyPy- γ -ImImHpPy- β -Py

TABLE 173: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTGSNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2001 β) 5'-W G T G G T T W-3'	Im- β -ImImHpHp- γ -PyPyPyPy- β -Py
	2002 β) 5'-W G T G G T A W-3'	Im- β -ImImHpPy- γ -HpPyPyPy- β -Py
	2003 β) 5'-W G T G G T G W-3'	Im- β -ImImHpIm- γ -PyPyPyPy- β -Py
	2004 β) 5'-W G T G G T C W-3'	Im- β -ImImHpPy- γ -ImPyPyPy- β -Py
	2005 β) 5'-W G T G G A T W-3'	Im- β -ImImPyHp- γ -PyHpPyPy- β -Py
	2006 β) 5'-W G T G G A A W-3'	Im- β -ImImPyPy- γ -HpHpPyPy- β -Py
10	2007 β) 5'-W G T G G A G W-3'	Im- β -ImImPyIm- γ -PyHpPyPy- β -Py
	2008 β) 5'-W G T G G A C W-3'	Im- β -ImImPyPy- γ -ImHpPyPy- β -Py
	2009 β) 5'-W G T G G G T W-3'	Im- β -ImImImHp- γ -PyPyPyPy- β -Py
	2010 β) 5'-W G T G G G A W-3'	Im- β -ImImImPy- γ -HpPyPyPy- β -Py
	2011 β) 5'-W G T G G C T W-3'	Im- β -ImImPyHp- γ -PyImPyPy- β -Py
15	2012 β) 5'-W G T G G C A W-3'	Im- β -ImImPyPy- γ -HpImPyPy- β -Py
	2013 β) 5'-W G T G C T T W-3'	Im- β -ImPyHpHp- γ -PyPyImPy- β -Py
	2014 β) 5'-W G T G C T A W-3'	Im- β -ImPyHpPy- γ -HpPyImPy- β -Py
	2015 β) 5'-W G T G C T G W-3'	Im- β -ImPyHpIm- γ -PyPyImPy- β -Py
	2016 β) 5'-W G T G C T C W-3'	Im- β -ImPyHpPy- γ -ImPyImPy- β -Py
20	2017 β) 5'-W G T G C A T W-3'	Im- β -ImPyPyHp- γ -PyHpImPy- β -Py
	2018 β) 5'-W G T G C A A W-3'	Im- β -ImPyPyPy- γ -HpHpImPy- β -Py
	2019 β) 5'-W G T G C A G W-3'	Im- β -ImPyPyIm- γ -PyHpImPy- β -Py
	2020 β) 5'-W G T G C A C W-3'	Im- β -ImPyPyPy- γ -ImHpImPy- β -Py
	2021 β) 5'-W G T G C G T W-3'	Im- β -ImPyImHp- γ -PyPyImPy- β -Py
25	2022 β) 5'-W G T G C G A W-3'	Im- β -ImPyImPy- γ -HpPyImPy- β -Py
	2023 β) 5'-W G T G C C T W-3'	Im- β -ImPyPyHp- γ -PyImImPy- β -Py
	2024 β) 5'-W G T G C C A W-3'	Im- β -ImPyPyPy- γ -HpImImPy- β -Py
	2025 β) 5'-W G T G G G G W-3'	Im- β -ImImImIm- γ -PyPyPyPy- β -Py
	2026 β) 5'-W G T G G G C W-3'	Im- β -ImImImPy- γ -ImPyPyPy- β -Py
30	2027 β) 5'-W G T G G C G W-3'	Im- β -ImImPyIm- γ -PyImPyPy- β -Py
	2028 β) 5'-W G T G G C C W-3'	Im- β -ImImPyPy- γ -ImImPyPy- β -Py
	2029 β) 5'-W G T G C G G W-3'	Im- β -mPyImIm- γ -PyPyImPy- β -Py
	2030 β) 5'-W G T G C G C W-3'	Im- β -ImPyImPy- γ -ImPyImPy- β -Py
	2031 β) 5'-W G T G C C G W-3'	Im- β -ImPyPyIm- γ -PyImImPy- β -Py
35	2032 β) 5'-W G T G C C C W-3'	Im- β -ImPyPyPy- γ -ImImImPy- β -Py

TABLE 174: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTTWNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2033 β) 5'-W G T T T T T W-3'	ImHp- β -HpHpHp- γ -PyPyPy- β -PyPy
	2034 β) 5'-W G T T T T A W-3'	ImHp- β -HpHpPy- γ -HpPyPy- β -PyPy
	2035 β) 5'-W G T T T T G W-3'	ImHp- β -HpHpIm- γ -PyPyPy- β -PyPy
	2036 β) 5'-W G T T T T C W-3'	ImHp- β -HpHpPy- γ -ImPyPy- β -PyPy
	2037 β) 5'-W G T T T A T W-3'	ImHp- β -HpPyHp- γ -PyHpPy- β -PyPy
	2038 β) 5'-W G T T T A A W-3'	ImHp- β -HpPyPy- γ -HpHpPy- β -PyPy
10	2039 β) 5'-W G T T T A G W-3'	ImHp- β -HpPyIm- γ -PyHpPy- β -PyPy
	2040 β) 5'-W G T T T A C W-3'	ImHp- β -HpPyPy- γ -ImHpPy- β -PyPy
	2041 β) 5'-W G T T T G T W-3'	ImHp- β -HpImHp- γ -PyPyPy- β -PyPy
	2042 β) 5'-W G T T T G A W-3'	ImHp- β -HpImPy- γ -HpPyPy- β -PyPy
	2043 β) 5'-W G T T T G G W-3'	ImHp- β -HpImIm- γ -PyPyPy- β -PyPy
15	2044 β) 5'-W G T T T G C W-3'	ImHp- β -HpImPy- γ -ImPyPy- β -PyPy
	2045 β) 5'-W G T T T C T W-3'	ImHp- β -HpPyHp- γ -PyImPy- β -PyPy
	2046 β) 5'-W G T T T C A W-3'	ImHp- β -HpPyPy- γ -HpImPy- β -PyPy
	2047 β) 5'-W G T T T C G W-3'	ImHp- β -HpPyIm- γ -PyImPy- β -PyPy
	2048 β) 5'-W G T T T C C W-3'	ImHp- β -HpPyPy- γ -ImImPy- β -PyPy
20	2049 β) 5'-W G T T A T T W-3'	ImHp- β -PyHpHp- γ -PyPyHp- β -PyPy
	2050 β) 5'-W G T T A T A W-3'	ImHp- β -PyHpPy- γ -HpPyHp- β -PyPy
	2051 β) 5'-W G T T A T G W-3'	ImHp- β -PyHpIm- γ -PyPyHp- β -PyPy
	2052 β) 5'-W G T T A T C W-3'	ImHp- β -PyHpPy- γ -ImPyHp- β -PyPy
	2053 β) 5'-W G T T A A T W-3'	ImHp- β -PyPyHp- γ -PyHpHp- β -PyPy
25	2054 β) 5'-W G T T A A A W-3'	ImHp- β -PyPyPy- γ -HpHpHp- β -PyPy
	2055 β) 5'-W G T T A A G W-3'	ImHp- β -PyPyIm- γ -PyHpHp- β -PyPy
	2056 β) 5'-W G T T A A C W-3'	ImHp- β -PyPyPy- γ -ImHpHp- β -PyPy
	2057 β) 5'-W G T T A G T W-3'	ImHp- β -PyImHp- γ -PyPyHp- β -PyPy
	2058 β) 5'-W G T T A G A W-3'	ImHp- β -PyImPy- γ -HpPyHp- β -PyPy
30	2059 β) 5'-W G T T A G G W-3'	ImHp- β -PyImIm- γ -PyPyHp- β -PyPy
	2060 β) 5'-W G T T A G C W-3'	ImHp- β -PyImPy- γ -ImPyHp- β -PyPy
	2061 β) 5'-W G T T A C T W-3'	ImHp- β -PyPyHp- γ -PyImHp- β -PyPy
	2062 β) 5'-W G T T A C A W-3'	ImHp- β -PyPyPy- γ -HpImHp- β -PyPy
	2063 β) 5'-W G T T A C G W-3'	ImHp- β -PyPyIm- γ -PyImHp- β -PyPy
35	2064 β) 5'-W G T T A C C W-3'	ImHp- β -PyPyPy- γ -ImImHp- β -PyPy

TABLE 175: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTTSNW-3'

	DNA sequence	aromatic amino acid sequence
5	2065 β) 5'-W G T T G T T W-3'	ImHp- β -ImHpHp- γ -PyPyPy- β -PyPy
	2066 β) 5'-W G T T G T A W-3'	ImHp- β -ImHpPy- γ -HpPyPy- β -PyPy
	2067 β) 5'-W G T T G T G W-3'	ImHp- β -ImHpIm- γ -PyPyPy- β -PyPy
	2068 β) 5'-W G T T G T C W-3'	ImHp- β -ImHpPy- γ -ImPyPy- β -PyPy
	2069 β) 5'-W G T T G A T W-3'	ImHp- β -ImPyHp- γ -PyHpPy- β -PyPy
10	2070 β) 5'-W G T T G A A W-3'	ImHp- β -ImPyPy- γ -HpHpPy- β -PyPy
	2071 β) 5'-W G T T G A G W-3'	ImHp- β -ImPyIm- γ -PyHpPy- β -PyPy
	2072 β) 5'-W G T T G A C W-3'	ImHp- β -ImPyPy- γ -ImHpPy- β -PyPy
	2073 β) 5'-W G T T G G T W-3'	ImHp- β -ImImHp- γ -PyPyPy- β -PyPy
	2074 β) 5'-W G T T G G A W-3'	ImHp- β -ImImPy- γ -HpPyPy- β -PyPy
15	2075 β) 5'-W G T T G C T W-3'	ImHp- β -ImPyHp- γ -PyImPy- β -PyPy
	2076 β) 5'-W G T T G C A W-3'	ImHp- β -ImPyPy- γ -HpImPy- β -PyPy
	2077 β) 5'-W G T T G G G W-3'	ImHp- β -ImImIm- γ -PyPyPy- β -PyPy
	2078 β) 5'-W G T T G G C W-3'	ImHp- β -ImImPy- γ -ImPyPy- β -PyPy
	2079 β) 5'-W G T T G C G W-3'	ImHp- β -ImPyIm- γ -PyImPy- β -PyPy
20	2080 β) 5'-W G T T G C C W-3'	ImHp- β -ImPyPy- γ -ImImPy- β -PyPy
	2081 β) 5'-W G T T C T T W-3'	ImHp- β -PyHpHp- γ -PyPyIm- β -PyPy
	2082 β) 5'-W G T T C T A W-3'	ImHp- β -PyHpPy- γ -HpPyIm- β -PyPy
	2083 β) 5'-W G T T C T G W-3'	ImHp- β -PyHpIm- γ -PyPyIm- β -PyPy
	2084 β) 5'-W G T T C T C W-3'	ImHp- β -PyHpPy- γ -ImPyIm- β -PyPy
	2085 β) 5'-W G T T C A T W-3'	ImHp- β -PyPyHp- γ -PyHpIm- β -PyPy
25	2086 β) 5'-W G T T C A A W-3'	ImHp- β -PyPyPy- γ -HpHpIm- β -PyPy
	2087 β) 5'-W G T T C A G W-3'	ImHp- β -PyPyIm- γ -PyHpIm- β -PyPy
	2088 β) 5'-W G T T C A C W-3'	ImHp- β -PyPyPy- γ -ImHpIm- β -PyPy
	2089 β) 5'-W G T T C G T W-3'	ImHp- β -PyImHp- γ -PyPyIm- β -PyPy
	2090 β) 5'-W G T T C G A W-3'	ImHp- β -PyImPy- γ -HpPyIm- β -PyPy
30	2091 β) 5'-W G T T C C T W-3'	ImHp- β -PyPyHp- γ -PyImIm- β -PyPy
	2092 β) 5'-W G T T C C A W-3'	ImHp- β -PyPyPy- γ -HpImIm- β -PyPy
	2093 β) 5'-W G T T C G G W-3'	ImHp- β -PyImIm- γ -PyPyIm- β -PyPy
	2094 β) 5'-W G T T C G C W-3'	ImHp- β -PyImPy- γ -ImPyIm- β -PyPy
	2095 β) 5'-W G T T C C G W-3'	ImHp- β -PyPyIm- γ -PyImIm- β -PyPy
35	2096 β) 5'-W G T T C C C W-3'	ImHp- β -PyPyPy- γ -ImImIm- β -PyPy

TABLE 176: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTAWNNW-3'

	DNA sequence	aromatic amino acid sequence
	2097 β) 5'-W G T A T T T W-3'	ImHp- β -HpHpHp- γ -PyPyPy- β -PyPy
5	2098 β) 5'-W G T A T T A W-3'	ImHp- β -HpHpPy- γ -HpPyPy- β -PyPy
	2099 β) 5'-W G T A T T G W-3'	ImHp- β -HpHpIm- γ -PyPyPy- β -PyPy
	2100 β) 5'-W G T A T T C W-3'	ImHp- β -HpHpPy- γ -ImPyPy- β -PyPy
	2101 β) 5'-W G T A T A T W-3'	ImHp- β -HpPyHp- γ -PyHpPy- β -PyPy
	2102 β) 5'-W G T A T A A W-3'	ImHp- β -HpPyPy- γ -HpHpPy- β -PyPy
10	2103 β) 5'-W G T A T A G W-3'	ImHp- β -HpPyIm- γ -PyHpPy- β -PyPy
	2104 β) 5'-W G T A T A C W-3'	ImHp- β -HpPyPy- γ -ImHpPy- β -PyPy
	2105 β) 5'-W G T A T G T W-3'	ImHp- β -HpImHp- γ -PyPyPy- β -PyPy
	2106 β) 5'-W G T A T G A W-3'	ImHp- β -HpImPy- γ -HpPyPy- β -PyPy
	2107 β) 5'-W G T A T G G W-3'	ImHp- β -HpImIm- γ -PyPyPy- β -PyPy
15	2108 β) 5'-W G T A T G C W-3'	ImHp- β -HpImPy- γ -ImPyPy- β -PyPy
	2109 β) 5'-W G T A T C T W-3'	ImHp- β -HpPyHp- γ -PyImPy- β -PyPy
	2110 β) 5'-W G T A T C A W-3'	ImHp- β -HpPyPy- γ -HpImPy- β -PyPy
	2111 β) 5'-W G T A T C G W-3'	ImHp- β -HpPyIm- γ -PyImPy- β -PyPy
	2112 β) 5'-W G T A T C C W-3'	ImHp- β -HpPyPy- γ -ImImPy- β -PyPy
20	2113 β) 5'-W G T A A A T T W-3'	ImHp- β -PyHpHp- γ -PyPyHp- β -PyPy
	2114 β) 5'-W G T A A A T A W-3'	ImHp- β -PyHpPy- γ -HpPyHp- β -PyPy
	2115 β) 5'-W G T A A A T G W-3'	ImHp- β -PyHpIm- γ -PyPyHp- β -PyPy
	2116 β) 5'-W G T A A A T C W-3'	ImHp- β -PyHpPy- γ -ImPyHp- β -PyPy
	2117 β) 5'-W G T A A A A T W-3'	ImHp- β -PyPyHp- γ -PyHpHp- β -PyPy
25	2118 β) 5'-W G T A A A A W-3'	ImHp- β -PyPyPy- γ -HpHpHp- β -PyPy
	2119 β) 5'-W G T A A A A G W-3'	ImHp- β -PyPyIm- γ -PyHpHp- β -PyPy
	2120 β) 5'-W G T A A A A C W-3'	ImHp- β -PyPyPy- γ -ImHpHp- β -PyPy
	2121 β) 5'-W G T A A A G T W-3'	ImHp- β -PyImHp- γ -PyPyHp- β -PyPy
	2122 β) 5'-W G T A A A G A W-3'	ImHp- β -PyImPy- γ -HpPyHp- β -PyPy
30	2123 β) 5'-W G T A A A G G W-3'	ImHp- β -PyImIm- γ -PyPyHp- β -PyPy
	2124 β) 5'-W G T A A A G C W-3'	ImHp- β -PyImPy- γ -ImPyHp- β -PyPy
	2125 β) 5'-W G T A A A C T W-3'	ImHpPyPyPyHp- γ -PyImHp- β -PyPy
	2126 β) 5'-W G T A A A C A W-3'	ImHpPyPyPy- γ -HpImHp- β -PyPy
	2127 β) 5'-W G T A A A C G W-3'	ImHpPyPyPy- γ -PyImHp- β -PyPy
35	2128 β) 5'-W G T A A A C C W-3'	ImHpPyPyPy- γ -ImImHp- β -PyPy

TABLE 177: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTASNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2129 β) 5'-W G T A G T T W-3'	ImHp- β -ImHpHp- γ -PyPyPy- β -PyPy
	2130 β) 5'-W G T A G T A W-3'	ImHp- β -ImHpPy- γ -HpPyPy- β -PyPy
	2131 β) 5'-W G T A G T G W-3'	ImHp- β -ImHpIm- γ -PyPyPy- β -PyPy
	2132 β) 5'-W G T A G T C W-3'	ImHp- β -ImHpPy- γ -ImPyPy- β -PyPy
	2133 β) 5'-W G T A G A T W-3'	ImHp- β -ImPyHp- γ -PyHpPy- β -PyPy
	2134 β) 5'-W G T A G A A W-3'	ImHp- β -ImPyPy- γ -HpHpPy- β -PyPy
10	2135 β) 5'-W G T A G A G W-3'	ImHp- β -ImPyIm- γ -PyHpPy- β -PyPy
	2136 β) 5'-W G T A G A C W-3'	ImHp- β -ImPyPy- γ -ImHpPy- β -PyPy
	2137 β) 5'-W G T A G G T W-3'	ImHp- β -ImImHp- γ -PyPyPy- β -PyPy
	2138 β) 5'-W G T A G G A W-3'	ImHp- β -ImImPy- γ -HpPyPy- β -PyPy
	2139 β) 5'-W G T A G C T W-3'	ImHp- β -ImPyHp- γ -PyImPy- β -PyPy
15	2140 β) 5'-W G T A G C A W-3'	ImHp- β -ImPyPy- γ -HpImPy- β -PyPy
	2141 β) 5'-W G T A G G G W-3'	ImHp- β -ImImIm- γ -PyPyPy- β -PyPy
	2142 β) 5'-W G T A G G C W-3'	ImHp- β -ImImPy- γ -ImPyPy- β -PyPy
	2143 β) 5'-W G T A G C G W-3'	ImHp- β -ImPyIm- γ -PyImPy- β -PyPy
	2144 β) 5'-W G T A G C C W-3'	ImHp- β -ImPyPy- γ -ImImPy- β -PyPy
20	2145 β) 5'-W G T A C T T W-3'	ImHp- β -PyHpHp- γ -PyPyIm- β -PyPy
	2146 β) 5'-W G T A C T A W-3'	ImHp- β -PyHpPy- γ -HpPyIm- β -PyPy
	2147 β) 5'-W G T A C T G W-3'	ImHp- β -PyHpIm- γ -PyPyIm- β -PyPy
	2148 β) 5'-W G T A C T C W-3'	ImHp- β -PyHpPy- γ -ImPyIm- β -PyPy
	2149 β) 5'-W G T A C A T W-3'	ImHp- β -PyPyHp- γ -PyHpIm- β -PyPy
25	2150 β) 5'-W G T A C A A W-3'	ImHp- β -PyPyPy- γ -HpHpIm- β -PyPy
	2151 β) 5'-W G T A C A G W-3'	ImHp- β -PyPyIm- γ -PyHpIm- β -PyPy
	2152 β) 5'-W G T A C A C W-3'	ImHp- β -PyPyPy- γ -ImHpIm- β -PyPy
	2153 β) 5'-W G T A C G T W-3'	ImHp- β -PyImHp- γ -PyPyIm- β -PyPy
	2154 β) 5'-W G T A C G A W-3'	ImHp- β -PyImPy- γ -HpPyIm- β -PyPy
30	2155 β) 5'-W G T A C C T W-3'	ImHp- β -PyPyHp- γ -PyImIm- β -PyPy
	2156 β) 5'-W G T A C C A W-3'	ImHp- β -PyPyPy- γ -HpImIm- β -PyPy
	2157 β) 5'-W G T A C G G W-3'	ImHp- β -PyImIm- γ -PyPyIm- β -PyPy
	2158 β) 5'-W G T A C G C W-3'	ImHp- β -PyImPy- γ -ImPyIm- β -PyPy
	2159 β) 5'-W G T A C C G W-3'	ImHp- β -PyPyIm- γ -PyImIm- β -PyPy
35	2160 β) 5'-W G T A C C C W-3'	ImHp- β -PyPyPy- γ -ImImIm- β -PyPy

TABLE 178: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTCWNNW-3'

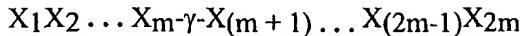
	DNA sequence	aromatic amino acid sequence
5	2161 β) 5'-W G T C T T T W-3'	ImHpPy- β -HpHp- γ -PyPy- β -ImPyPy
	2162 β) 5'-W G T C T T A W-3'	ImHpPy- β -HpPy- γ -HpPy- β -ImPyPy
	2163 β) 5'-W G T C T T G W-3'	ImHpPy- β -HpIm- γ -PyPy- β -ImPyPy
	2164 β) 5'-W G T C T T C W-3'	ImHpPy- β -HpPy- γ -ImPy- β -ImPyPy
	2165 β) 5'-W G T C T A T W-3'	ImHpPy- β -PyHp- γ -PyHp- β -ImPyPy
10	2166 β) 5'-W G T C T A A W-3'	ImHpPy- β -PyPy- γ -HpHp- β -ImPyPy
	2167 β) 5'-W G T C T A G W-3'	ImHpPy- β -PyIm- γ -PyHp- β -ImPyPy
	2168 β) 5'-W G T C T A C W-3'	ImHpPy- β -PyPy- γ -ImHp- β -ImPyPy
	2169 β) 5'-W G T C T G T W-3'	ImHpPy- β -ImHp- γ -PyPy- β -ImPyPy
	2170 β) 5'-W G T C T G A W-3'	ImHpPy- β -ImPy- γ -HpPy- β -ImPyPy
	2171 β) 5'-W G T C T G G W-3'	ImHpPy- β -ImIm- γ -PyPy- β -ImPyPy
15	2172 β) 5'-W G T C T G C W-3'	ImHpPy- β -ImPy- γ -ImPy- β -ImPyPy
	2173 β) 5'-W G T C T C T W-3'	ImHpPy- β -PyHp- γ -PyIm- β -ImPyPy
	2174 β) 5'-W G T C T C A W-3'	ImHpPy- β -PyPy- γ -HpIm- β -ImPyPy
	2175 β) 5'-W G T C T C G W-3'	ImHpPy- β -PyIm- γ -PyIm- β -ImPyPy
	2176 β) 5'-W G T C T C C W-3'	ImHpPy- β -PyPy- γ -ImIm- β -ImPyPy
20	2177 β) 5'-W G T C A T T W-3'	ImHpPy- β -HpHp- γ -PyPy- β -ImPyPy
	2178 β) 5'-W G T C A T A W-3'	ImHpPy- β -HpPy- γ -HpPy- β -ImPyPy
	2179 β) 5'-W G T C A T G W-3'	ImHpPy- β -HpIm- γ -PyPy- β -ImPyPy
	2180 β) 5'-W G T C A T C W-3'	ImHpPy- β -HpPy- γ -ImPy- β -ImPyPy
	2181 β) 5'-W G T C A A T W-3'	ImHpPy- β -PyHp- γ -PyHp- β -ImPyPy
25	2182 β) 5'-W G T C A A A W-3'	ImHpPy- β -PyPy- γ -HpHp- β -ImPyPy
	2183 β) 5'-W G T C A A G W-3'	ImHpPy- β -PyIm- γ -PyHp- β -ImPyPy
	2184 β) 5'-W G T C A A C W-3'	ImHpPy- β -PyPy- γ -ImHp- β -ImPyPy
	2185 β) 5'-W G T C A G T W-3'	ImHpPy- β -ImHp- γ -PyPy- β -ImPyPy
	2186 β) 5'-W G T C A G A W-3'	ImHpPy- β -ImPy- γ -HpPy- β -ImPyPy
30	2187 β) 5'-W G T C A G G W-3'	ImHpPy- β -ImIm- γ -PyPy- β -ImPyPy
	2188 β) 5'-W G T C A G C W-3'	ImHpPy- β -ImPy- γ -ImPy- β -ImPyPy
	2189 β) 5'-W G T C A C T W-3'	ImHpPy- β -PyHp- γ -PyIm- β -ImPyPy
	2190 β) 5'-W G T C A C A W-3'	ImHpPy- β -PyPy- γ -HpIm- β -ImPyPy
	2191 β) 5'-W G T C A C G W-3'	ImHpPy- β -PyIm- γ -PyIm- β -ImPyPy
35	2192 β) 5'-W G T C A C C W-3'	ImHpPy- β -PyPy- γ -ImIm- β -ImPyPy

TABLE 179: 12-ring β -Hairpin Polyamides for recognition of 8-bp 5'-WGTCNNW-3'

	DNA sequence	aromatic amino acid sequence
5	2193 β) 5'-W G T C G T T W-3'	ImHp- β -ImHpHp- γ -PyPy- β -ImPyPy
	2194 β) 5'-W G T C G T A W-3'	ImHp- β -ImHpPy- γ -HpPy- β -ImPyPy
	2195 β) 5'-W G T C G T G W-3'	ImHp- β -ImHpIm- γ -PyPy- β -ImPyPy
	2196 β) 5'-W G T C G T C W-3'	ImHp- β -ImHpPy- γ -ImPy- β -ImPyPy
	2197 β) 5'-W G T C G A T W-3'	ImHp- β -ImPyHp- γ -PyHp- β -ImPyPy
	2198 β) 5'-W G T C G A A W-3'	ImHp- β -ImPyPy- γ -HpHp- β -ImPyPy
10	2199 β) 5'-W G T C G A G W-3'	ImHp- β -ImPyIm- γ -PyHp- β -ImPyPy
	2200 β) 5'-W G T C G A C W-3'	ImHp- β -ImPyPy- γ -ImHp- β -ImPyPy
	2201 β) 5'-W G T C G G T W-3'	ImHp- β -ImImHp- γ -PyPy- β -ImPyPy
	2202 β) 5'-W G T C G G A W-3'	ImHp- β -ImImPy- γ -HpPy- β -ImPyPy
	2203 β) 5'-W G T C G C T W-3'	ImHp- β -ImPyHp- γ -PyIm- β -ImPyPy
15	2204 β) 5'-W G T C G C A W-3'	ImHp- β -ImPyPy- γ -HpIm- β -ImPyPy
	2205 β) 5'-W G T C C C T T W-3'	ImHp- β -PyHpHp- γ -Py- β -ImImPyPy
	2206 β) 5'-W G T C C C T A W-3'	ImHp- β -PyHpPy- γ -Hp- β -ImImPyPy
	2207 β) 5'-W G T C C C T G W-3'	ImHp- β -PyHpIm- γ -Py- β -ImImPyPy
	2208 β) 5'-W G T C C C T C W-3'	ImHp- β -PyHpPy- γ -Im- β -ImImPyPy
20	2209 β) 5'-W G T C C A T W-3'	ImHp- β -PyPyHp- γ -Py- β -ImImPyPy
	2210 β) 5'-W G T C C A A W-3'	ImHp- β -PyPyPy- γ -Hp- β -ImImPyPy
	2211 β) 5'-W G T C C A G W-3'	ImHp- β -PyPyIm- γ -Py- β -ImImPyPy
	2212 β) 5'-W G T C C A C W-3'	ImHp- β -PyPyPy- γ -Im- β -ImImPyPy
	2213 β) 5'-W G T C C G T W-3'	ImHp- β -PyImHp- γ -Py- β -ImImPyPy
25	2214 β) 5'-W G T C C G A W-3'	ImHp- β -PyImPy- γ -Hp- β -ImImPyPy
	2215 β) 5'-W G T C C C T W-3'	ImHp- β -PyPyHp- γ -PyImIm- β -Py
	2216 β) 5'-W G T C C C A W-3'	ImHp- β -PyPyPy- γ -HpImIm- β -Py
	2217 β) 5'-W G T C G G G W-3'	ImHp- β -ImImIm- γ -PyPy- β -ImPyPy
	2218 β) 5'-W G T C G G C W-3'	ImHp- β -ImImPy- γ -ImPy- β -ImPyPy
30	2219 β) 5'-W G T C G C G W-3'	ImHp- β -ImPyIm- γ -PyIm- β -ImPyPy
	2220 β) 5'-W G T C G C C W-3'	ImHp- β -ImPyPy- γ -ImIm- β -ImPyPy
	2221 β) 5'-W G T C C G G W-3'	ImHp- β -PyImIm- γ -Py- β -ImImPyPy
	2222 β) 5'-W G T C C G C W-3'	ImHp- β -PyImPy- γ -Im- β -ImImPyPy
	2223 β) 5'-W G T C C C C G W-3'	ImHp- β -PyPyIm- γ -PyImIm- β -Py
35	2224 β) 5'-W G T C C C C C W-3'	ImHp- β -PyPyPy- γ -ImImIm- β -Py

What is claimed is:

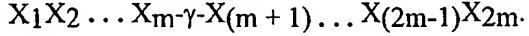
1. A method for designing a specific polyamide



5 wherein X_1 , X_2 , X_m , $X_{(m+1)}$, $X_{(2m-1)}$, and X_{2m} are carboxamide residues forming carboxamide binding pairs X_1/X_{2m} , $X_2/X_{(2m-1)}$, $X_m/X_{(m+1)}$, and γ is γ -aminobutyric acid or 2,4 diaminobutyric acid and D_p is dimethylaminopropylamide, suitable for use as a DNA-binding ligand that is selective for identified target DNA sequences 5'-WN₁N₂ . . . N_mW-3' where m is an integer having a value from 3 to 6, comprising the steps of:

- 10 a. identifying a target sequence of double stranded DNA having the form 5'-WN₁N₂ . . . N_mW-3', N₁N₂ . . . N_m being the sequence to be bound by carboxamide residues, wherein each N is independently chosen from the group A, G, C, and T, each W is independently chosen from the group A and T, and m is an integer having a value from 3 to 6;
- 15 b. representing the identified sequence as 5'-W_ab . . . xW-3', wherein a is a first nucleotide to be bound by the X_1 carboxamide residue, b is a second nucleotide to be bound by the X_2 carboxamide residue, and x is the corresponding nucleotide to be bound by the X_m carboxamide residue;
- 20 c. defining a as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified sequence;
- d. selecting I_m as the X_1 carboxamide residue and P_y as the X_{2m} carboxamide residue if $a = G$;
- e. selecting P_y as the X_1 carboxamide residue and I_m as the X_{2m} carboxamide residue if $a = C$;
- 25 f. selecting H_p as the X_1 carboxamide residue and P_y as the X_{2m} carboxamide residue if $a = T$;
- g. selecting P_y as the X_1 carboxamide residue and H_p as the X_{2m} carboxamide residue if $a = A$; and
- h. repeating steps c - g for b through x until all carboxamide residues are selected.

- 30 2. The method of claim 1 further comprising the step of synthesizing the polyamide



3. The method of claim 2 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.

-230-

4. The method of claim 2 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.
5. The method of claim 2 further comprising the step of replacing at least one pyrrole residue with a β -alanine residue.
- 5 6. A method for designing a selective polyamide molecule $X_1X_2X_3X_4-\gamma-X_5X_6X_7X_8$, wherein $X_1, X_2, X_3, X_4, X_5, X_6, X_7$, and X_8 , are carboxamide residues forming binding pairs $X_1/X_8, X_2/X_7, X_3/X_6$ and X_4/X_5 , and γ is γ -aminobutyric acid or 2,4-diaminobutyric acid suitable for binding to a six base pair sequence of the form 5'-WN>NNNWW-3' in the minor groove of double stranded DNA, comprising the steps of:
 - 10 a. identifying a six base pair sequence of double stranded DNA having the form 5'-WN>NNNWW-3', wherein W is either A or T, NNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;
 - b. representing the identified sequence as 5'-W a b c d W-3', wherein a is a first nucleotide to be bound by a carboxamide residue, b is a second nucleotide to be bound by a carboxamide residue, c is a third nucleotide to be bound by a carboxamide residue, and d is a fourth nucleotide to be bound by a carboxamide residue;
 - c. defining a as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
 - d. selecting Im as the X_1 carboxamide residue and Py as the X_8 carboxamide residue if $a = G$;
 - e. selecting Py as the X_1 carboxamide residue and Im as the X_8 carboxamide residue if $a = C$;
 - f. selecting Hp as the X_1 carboxamide residue and Py as the X_8 carboxamide residue if $a = T$;
 - 25 g. selecting Py as the X_1 carboxamide residue and Hp as the X_8 carboxamide residue if $a = A$;
 - h. defining b as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
 - i. selecting Im as the X_2 carboxamide residue and Py as the X_7 carboxamide residue if $b = G$;
 - j. selecting Py as the X_2 carboxamide residue and Im as the X_7 carboxamide residue if $b = C$;

-231-

- k. selecting Hp as the X₂ carboxamide residue and Py as the X₇ carboxamide residue if *b* = T;
 - l. selecting Py as the X₂ carboxamide residue and Hp as the X₇ carboxamide residue if *b* = A;
 - 5 m. defining *c* as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
 - n. selecting Im as the X₃ carboxamide residue and Py as the X₆ carboxamide residue if *c* = G;
 - 10 o. selecting Py as the X₃ carboxamide residue and Im as the X₆ carboxamide residue if *c* = C;
 - p. selecting Hp as the X₃ carboxamide residue and Py as the X₆ carboxamide residue if *c* = T;
 - q. selecting Py as the X₃ carboxamide residue and Hp as the X₆ carboxamide residue if *c* = A;
 - 15 r. defining *d* as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
 - s. selecting Im as the X₄ carboxamide residue and Py as the X₅ carboxamide residue if *d* = G;
 - t. selecting Py as the X₄ carboxamide residue and Im as the X₅ carboxamide residue if *d* = C;
 - 20 u. selecting Hp as the X₄ carboxamide residue and Py as the X₅ carboxamide residue if *d* = T; and
 - v. selecting Py as the X₄ carboxamide residue and Hp as the X₅ carboxamide residue if *d* = A.
- 25 7. The method of claim 6 further comprising the step of synthesizing the polyamide X₁X₂X₃X₄-γ-X₅X₆X₇X₈.
8. The method of claim 7 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.
9. The method of claim 7 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.
- 30 10. The method of claim 7 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue at a position chosen from the group consisting of X₂, X₃, X₆, and X₇.

-232-

11. The method of claim 7 further comprising the step of replacing at least one 3-hydroxypyrrole residue with a β -alanine residue at a position chosen from the group consisting of X₂, X₃, X₆, and X₇.
12. A polyamide composition produced by the process comprising the steps of:
 - 5 a. identifying a six base pair sequence of double stranded DNA having the form 5'-WN>NNN-W-3', wherein W is either A or T, NNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;
 - b. representing the identified sequence as 5'-W_abcdW-3', wherein *a* is a first nucleotide to be bound by a carboxamide residue, *b* is a second nucleotide to be bound by a carboxamide residue, *c* is a third nucleotide to be bound by a carboxamide residue, and *d* is a fourth nucleotide to be bound by a carboxamide residue;
 - c. defining *a* as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
 - d. selecting Im as the X₁ carboxamide residue and Py as the X₈ carboxamide residue if *a* = G;
 - e. selecting Py as the X₁ carboxamide residue and Im as the X₈ carboxamide residue if *a* = C;
 - f. selecting Hp as the X₁ carboxamide residue and Py as the X₈ carboxamide residue if *a* = T;
 - 20 g. selecting Py as the X₁ carboxamide residue and Hp as the X₈ carboxamide residue if *a* = A;
 - h. defining *b* as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
 - i. selecting Im as the X₂ carboxamide residue and Py as the X₇ carboxamide residue if *b* = G;
 - j. selecting Py as the X₂ carboxamide residue and Im as the X₇ carboxamide residue if *b* = C;
 - k. selecting Hp as the X₂ carboxamide residue and Py as the X₇ carboxamide residue if *b* = T;
 - 25 l. selecting Py as the X₂ carboxamide residue and Hp as the X₇ carboxamide residue if *b* = A;
 - m. defining *c* as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;

-233-

- n. selecting Im as the X₃ carboxamide residue and Py as the X₆ carboxamide residue if *c* = G;
- o. selecting Py as the X₃ carboxamide residue and Im as the X₆ carboxamide residue if *c* = C;
- 5 p. selecting Hp as the X₃ carboxamide residue and Py as the X₆ carboxamide residue if *c* = T;
- q. selecting Py as the X₃ carboxamide residue and Hp as the X₆ carboxamide residue if *c* = A;
- r. defining *d* as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the identified six base pair sequence;
- 10 s. selecting Im as the X₄ carboxamide residue and Py as the X₅ carboxamide residue if *d* = G;
- t. selecting Py as the X₄ carboxamide residue and Im as the X₅ carboxamide residue if *d* = C;
- 15 u. selecting Hp as the X₄ carboxamide residue and Py as the X₅ carboxamide residue if *d* = T;
- v. selecting Py as the X₄ carboxamide residue and Hp as the X₅ carboxamide residue if *d* = A; and
- w. synthesizing the polyamide X₁X₂X₃X₄-γ-X₅X₆X₇X₈.
- 20 13. The polyamides described by the formulas listed in Tables 4 – 19.
14. The polyamides described by the formulas listed in Tables 20 – 83.
15. The polyamides described by the formulas listed in Tables 84 – 179.
16. A method for designing a selective polyamide molecule X₁X₂X₃X₄X₅-γ-X₆X₇X₈X₉X₁₀, wherein X₁, X₂, X₃, X₄, X₅, X₆, X₇, X₈, X₉, and X₁₀ are carboxamide residues forming binding pairs X₁/X₁₀, X₂/X₉, X₃/X₈, X₄/X₇, and X₅/X₆, and γ is γ-aminobutyric acid or 2,4 diaminobutyric acid suitable for binding to a six base pair sequence of the form 5'-WNNNNNW-3' in the minor groove of double stranded DNA, comprising the steps of:
- 25 a. identifying a seven base pair sequence of double stranded DNA having the form 5'-WNNNNNW-3', wherein W is either A or T, NNNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;
- b. representing the identified sequence as 5'-W*abcde*W-3', wherein *a* is a first nucleotide to be bound by a carboxamide residue, *b* is a second nucleotide to be

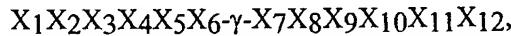
-234-

- bound by a carboxamide residue, *c* is a third nucleotide to be bound by a carboxamide residue, *d* is a fourth nucleotide to be bound by a carboxamide residue, and *e* is a fifth nucleotide to be bound by a carboxamide residue;
- 5 c. defining *a* as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified seven base pair sequence;
 - d. selecting Im as the X₁ carboxamide residue and Py as the X₁₀ carboxamide residue if *a* = G;
 - e. selecting Py as the X₁ carboxamide residue and Im as the X₁₀ carboxamide residue if *a* = C;
 - 10 f. selecting Hp as the X₁ carboxamide residue and Py as the X₁₀ carboxamide residue if *a* = T;
 - g. selecting Py as the X₁ carboxamide residue and Hp as the X₁₀ carboxamide residue if *a* = A;
 - 15 h. defining *b* as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified seven base pair sequence;
 - i. selecting Im as the X₂ carboxamide residue and Py as the X₉ carboxamide residue if *b* = G;
 - j. selecting Py as the X₂ carboxamide residue and Im as the X₉ carboxamide residue if *b* = C;
 - 20 k. selecting Hp as the X₂ carboxamide residue and Py as the X₉ carboxamide residue if *b* = T;
 - l. selecting Py as the X₂ carboxamide residue and Hp as the X₉ carboxamide residue if *b* = A;
 - 25 m. defining *c* as A, G, C, or T to correspond to the third nucleotide to be bound by a carboxamide residue in the identified seven base pair sequence;
 - n. selecting Im as the X₃ carboxamide residue and Py as the X₈ carboxamide residue if *c* = G;
 - o. selecting Py as the X₃ carboxamide residue and Im as the X₈ carboxamide residue if *c* = C;
 - 30 p. selecting Hp as the X₃ carboxamide residue and Py as the X₈ carboxamide residue if *c* = T;
 - q. selecting Py as the X₃ carboxamide residue and Hp as the X₈ carboxamide residue if *c* = A;

- r. defining *d* as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the seven base pair sequence identified sequence;
 - s. selecting Im as the X₄ carboxamide residue and Py as the X₇ carboxamide residue if *d* = G;
 - 5 t. selecting Py as the X₄ carboxamide residue and Im as the X₇ carboxamide residue if *d* = C;
 - u. selecting Hp as the X₄ carboxamide residue and Py as the X₇ carboxamide residue if *d* = T;
 - v. selecting Py as the X₄ carboxamide residue and Hp as the X₇ carboxamide residue if *d* = A;
 - 10 w. defining *e* as A, G, C, or T to correspond to the fifth nucleotide to be bound by a carboxamide residue in the seven base pair sequence identified sequence;
 - x. selecting Im as the X₅ carboxamide residue and Py as the X₆ carboxamide residue if *e* = G;
 - y. selecting Py as the X₅ carboxamide residue and Im as the X₆ carboxamide residue if *e* = C;
 - 15 z. selecting Hp as the X₅ carboxamide residue and Py as the X₆ carboxamide residue if *e* = T; and
 - aa. selecting Py as the X₅ carboxamide residue and Hp as the X₆ carboxamide residue if *e* = A.
- 20
- 17. The method of claim 16 further comprising the step of synthesizing the polyamide X₁X₂X₃X₄X₅-γ-X₆X₇X₈X₉X₁₀.
 - 18. The method of claim 17 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.
 - 25 19. The method of claim 17 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.
 - 20. The method of claim 17 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue at a position chosen from the group consisting of X₂, X₃, X₄, X₇, X₈, and X₉.
 - 30 21. The method of claim 17 further comprising the step of replacing at least one 3-hydroxypyrrrole residue with a β-alanine residue at a position chosen from the group consisting of X₂, X₃, X₄, X₇, X₈, and X₉.

-236-

22. A polyamide composition produced by the method of claim 17.
23. A polyamide composition produced by the method of claim 18.
24. A polyamide composition produced by the method of claim 19.
25. A polyamide composition produced by the method of claim 20.
- 5 26. A polyamide composition produced by the method of claim 21.
27. A method for designing a selective polyamide molecule



wherein X_1 , X_2 , X_3 , X_4 , X_5 , X_6 , X_7 , X_8 , X_9 , X_{10} , X_{11} , and X_{12} , are carboxamide residues forming binding pairs X_1/X_{12} , X_2/X_{11} , X_3/X_{10} , X_4/X_9 , X_5/X_8 , and X_6/X_7 , and γ is γ -aminobutyric acid or 2,4 diaminobutyric acid

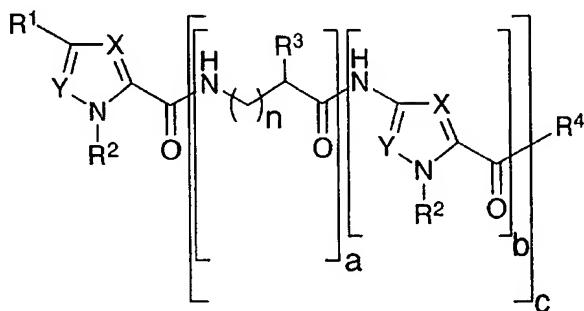
10 suitable for binding to a eight base pair sequence of the form 5'-WNNNNNNNW-3' in the minor groove of double stranded DNA, comprising the steps of:

- a. identifying a eight base pair sequence of double stranded DNA having the form 5'-WNNNNNNNW-3', wherein W is either A or T, NNNNNN is the sequence to be bound by carboxamide residues, and each N is independently A, G, C, or T;
- b. representing the identified sequence as 5'-W a b c d e fW-3', wherein a is a first nucleotide to be bound by a carboxamide residue, b is a second nucleotide to be bound by a carboxamide residue, c is a third nucleotide to be bound by a carboxamide residue, d is a fourth nucleotide to be bound by a carboxamide residue, e is a fifth nucleotide to be bound by a carboxamide residue and f is a sixth nucleotide to be bound by a carboxamide residue;
- c. defining a as A, G, C, or T to correspond to the first nucleotide to be bound by a carboxamide residue in the identified eight base pair sequence;
- d. selecting Im as the X_1 carboxamide residue and Py as the X_{12} carboxamide residue if $a = G$;
- e. selecting Py as the X_1 carboxamide residue and Im as the X_{10} carboxamide residue if $a = C$;
- f. selecting Hp as the X_1 carboxamide residue and Py as the X_{12} carboxamide residue if $a = T$;
- 20 g. selecting Py as the X_1 carboxamide residue and Hp as the X_{12} carboxamide residue if $a = A$;
- 25 h. defining b as A, G, C, or T to correspond to the second nucleotide to be bound by a carboxamide residue in the identified eight base pair sequence;

- i. selecting Im as the X₂ carboxamide residue and Py as the X₁₁ carboxamide residue if $b = G$;
- j. selecting Py as the X₂ carboxamide residue and Im as the X₁₁ carboxamide residue if $b = C$;
- 5 k. selecting Hp as the X₂ carboxamide residue and Py as the X₁₁ carboxamide residue if $b = T$;
- l. selecting Py as the X₂ carboxamide residue and Hp as the X₁₁ carboxamide residue if $b = A$;
- m. defining c as A, G, C, or T to correspond to the third nucleotide to be bound by a 10 carboxamide residue in the identified eight base pair sequence;
- n. selecting Im as the X₃ carboxamide residue and Py as the X₁₀ carboxamide residue if $c = G$;
- 15 o. selecting Py as the X₃ carboxamide residue and Im as the X₁₀ carboxamide residue if $c = C$;
- p. selecting Hp as the X₃ carboxamide residue and Py as the X₁₀ carboxamide residue if $c = T$;
- 20 q. selecting Py as the X₃ carboxamide residue and Hp as the X₁₀ carboxamide residue if $c = A$;
- r. defining d as A, G, C, or T to correspond to the fourth nucleotide to be bound by a carboxamide residue in the eight base pair sequence identified sequence;
- s. selecting Im as the X₄ carboxamide residue and Py as the X₉ carboxamide residue if 25 $d = G$;
- t. selecting Py as the X₄ carboxamide residue and Im as the X₉ carboxamide residue if $d = C$;
- u. selecting Hp as the X₄ carboxamide residue and Py as the X₉ carboxamide residue if $d = T$;
- v. selecting Py as the X₄ carboxamide residue and Hp as the X₉ carboxamide residue if 30 $d = A$;
- w. defining e as A, G, C, or T to correspond to the fifth nucleotide to be bound by a carboxamide residue in the eight base pair sequence identified sequence;
- x. selecting Im as the X₅ carboxamide residue and Py as the X₈ carboxamide residue if $e = G$;

- y. selecting Py as the X₅ carboxamide residue and Im as the X₈ carboxamide residue if
 $e = C$;
 - z. selecting Hp as the X₅ carboxamide residue and Py as the X₈ carboxamide residue if
 $e = T$;
 - 5 aa. selecting Py as the X₅ carboxamide residue and Hp as the X₈ carboxamide residue if
 $e = A$;
 - bb. defining f as A, G, C, or T to correspond to the sixth nucleotide to be bound by a carboxamide residue in the eight base pair sequence identified sequence;
 - cc. selecting Im as the X₆ carboxamide residue and Py as the X₇ carboxamide residue if
10 $f = G$;
 - dd. selecting Py as the X₆ carboxamide residue and Im as the X₇ carboxamide residue if
 $f = C$;
 - ee. selecting Hp as the X₆ carboxamide residue and Py as the X₇ carboxamide residue if
 $f = T$; and
 - 15 ff. selecting Py as the X₆ carboxamide residue and Hp as the X₇ carboxamide residue if
 $f = A$.
28. The method of claim 17 further comprising the step of synthesizing the polyamide X₁X₂X₃X₄X₅X₆-γ-X₇X₈X₉X₁₀X₁₁X₁₂.
29. The method of claim 28 further comprising the step of determining if the binding affinity of the polyamide to the identified sequence is subnanomolar.
- 20 30. The method of claim 28 further comprising the step of determining if the sequence specificity of the polyamide is greater or equal to ten.
31. The method of claim 28 further comprising the step of replacing at least one pyrrole residue with a β-alanine residue at a position chosen from the group consisting of X₂, X₃, X₄, X₅, X₈, X₉, X₁₀, and X₁₁.
- 25 32. The method of claim 28 further comprising the step of replacing at least one 3-hydroxypyrrole residue with a β-alanine residue at a position chosen from the group consisting of X₂, X₃, X₄, X₅, X₈, X₉, X₁₀, and X₁₁.
33. A polyamide composition produced by the method of claim 28.
- 30 34. A polyamide composition produced by the method of claim 29.
35. A polyamide composition produced by the method of claim 30.
36. A polyamide composition produced by the method of claim 31.
37. A polyamide composition produced by the method of claim 32.

38. A polyamide composition produced by the method of claim 2 wherein one carboxamide binding pair is β/β .
39. A polyamide composition produced by the method of claim 7 wherein one carboxamide binding pair is β/β .
- 5 40. A polyamide composition produced by the method of claim 17 wherein one carboxamide binding pair is β/β .
41. A selective polyamide according to claim 1 whereby the polyamide is of the formula:



10 or a pharmaceutically acceptable salt wherein:

R^1 is chosen from H, NH₂, SH, Cl, Br, F, N-acetyl, or N-formyl;

R^2 is chosen from H, (CH₂)_mCH₃, (CH₂)_mNH₂, (CH₂)_mSH, (CH₂)_mOH, (CH₂)_mNR⁵₂, (CH₂)_mOR⁵, (CH₂)_mSR⁵, where R⁵ = (CH₂)_mCH₃, (CH₂)_mNH₂, (CH₂)_mSH, (CH₂)_mOH and m is an integer from 0 to 6;

15 R^3 is chosen from H, NH₂, OH, SH, Br, Cl, F, OMe, CH₂OH, CH₂SH, CH₂NH₂;

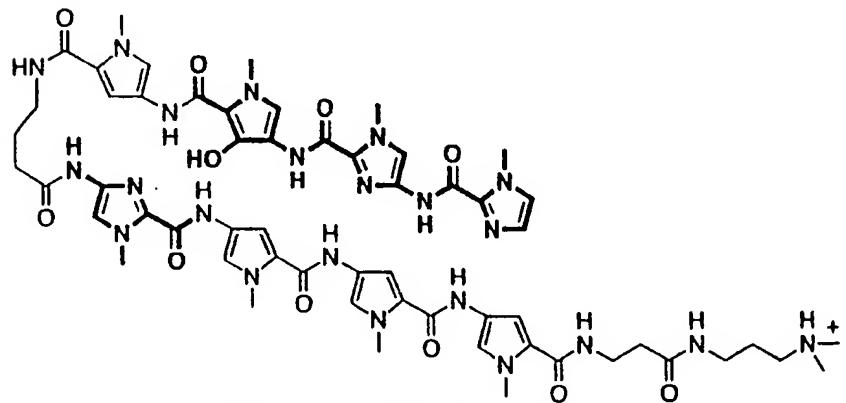
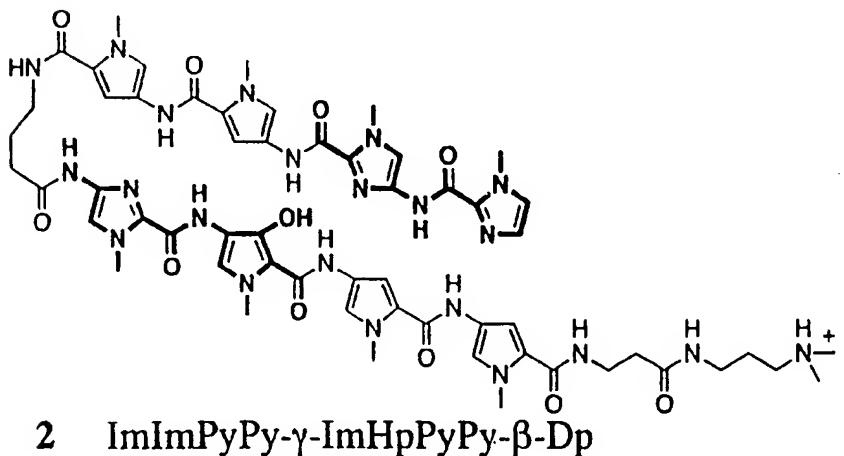
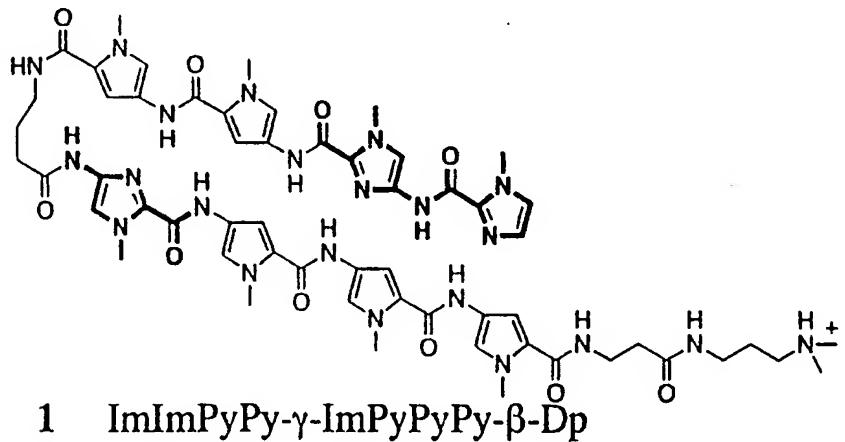
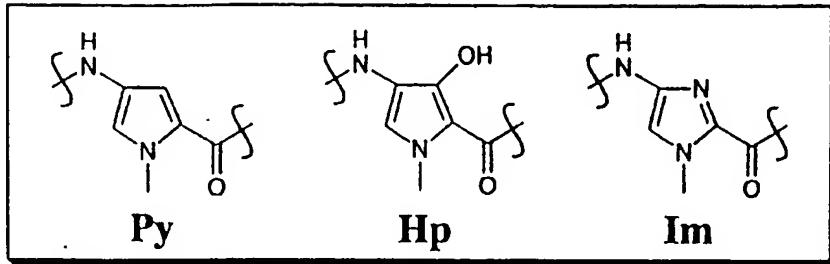
20 R^4 is chosen from -NH(CH₂)₀₋₁₀₀NR⁶R⁷ or NH(CH₂)_pCO NH(CH₂)₀₋₁₀₀NR⁶R⁷ or NHR⁶ or NH(CH₂)_pCONHR⁶, where R⁶ and R⁷ are independently chosen from H, Cl, NO, N-acetyl, benzyl, C₁₋₁₀₀ alkyl, C₁₋₁₀₀ alkylamine, C₁₋₁₀₀ alkyldiamine, C₁₋₁₀₀ alkylcarboxylate, C₁₋₁₀₀ alkenyl, a C₁₋₁₀₀ alkynyl, or a C₁₋₁₀₀L, where L groups can be independently chosen from but is not limited to arylboronic acids, biotins, polyhistidines comprised from about 2 to 8 amino acids, haptens to which an antibody binds, solid phase supports, oligodeoxynucleotide, N-ethylnitrosourea, fluorescein, bromoacetamide, iodoacetamide, DL- α -lipoic acid, acridine, captothesin, pyrene, mitomycin, texas red, anthracene, anthrinilic acid, avidin, DAPI, an oligodeoxynucleotide, isosulfan blue, malachite green, psoralen, ethyl red, 4-(psoraen-8-yloxy)-butyrate, tartaric acid, (+)- α -tocopheral;

-240-

where X and Y are chosen from the group consisting of N, CH, COH, CCH₃, CNH₂, CCl, CF;

- a is an integer having values of 0 or 1;
- b is an integer ranging from 1 to 5 inclusive; and
- c is an integer value ranging from 2 to 10 inclusive.

- 5 42. The polyamide of claim 1 wherein the duplex DNA sequence is a regulatory sequence.
- 43. The polyamide of claim 1 wherein the duplex DNA sequence is a promoter sequence.
- 44. The polyamide of claim 1 wherein the duplex DNA sequence is a coding sequence.
- 10 45. The polyamide of claim 1 wherein the duplex DNA sequence is a non-coding sequence.
- 46. The polyamide of claim 1 wherein the binding of the carboxamide binding pairs to the identified target DNA sequence modulates the expression of a gene.
- 47. A composition comprising an effective amount of the polyamide of claim 1 and a pharmologically suitable excipient.
- 15 48. A diagnostic kit comprising the polyamide of claim 1.

**FIG. I**

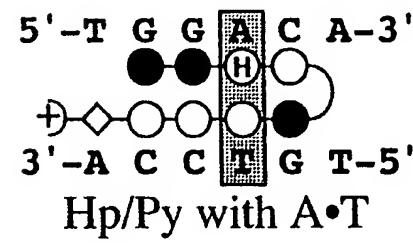
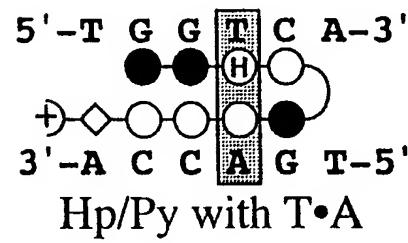
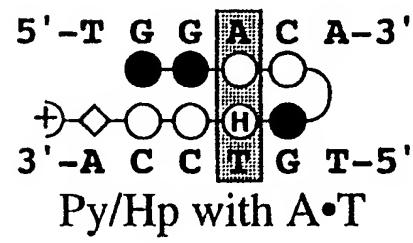
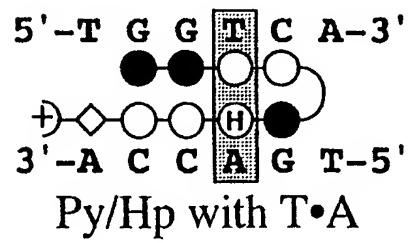
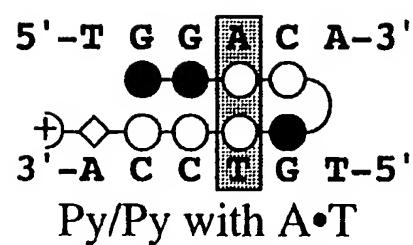
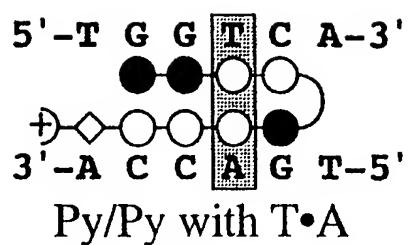


FIG. 2

3 / 14

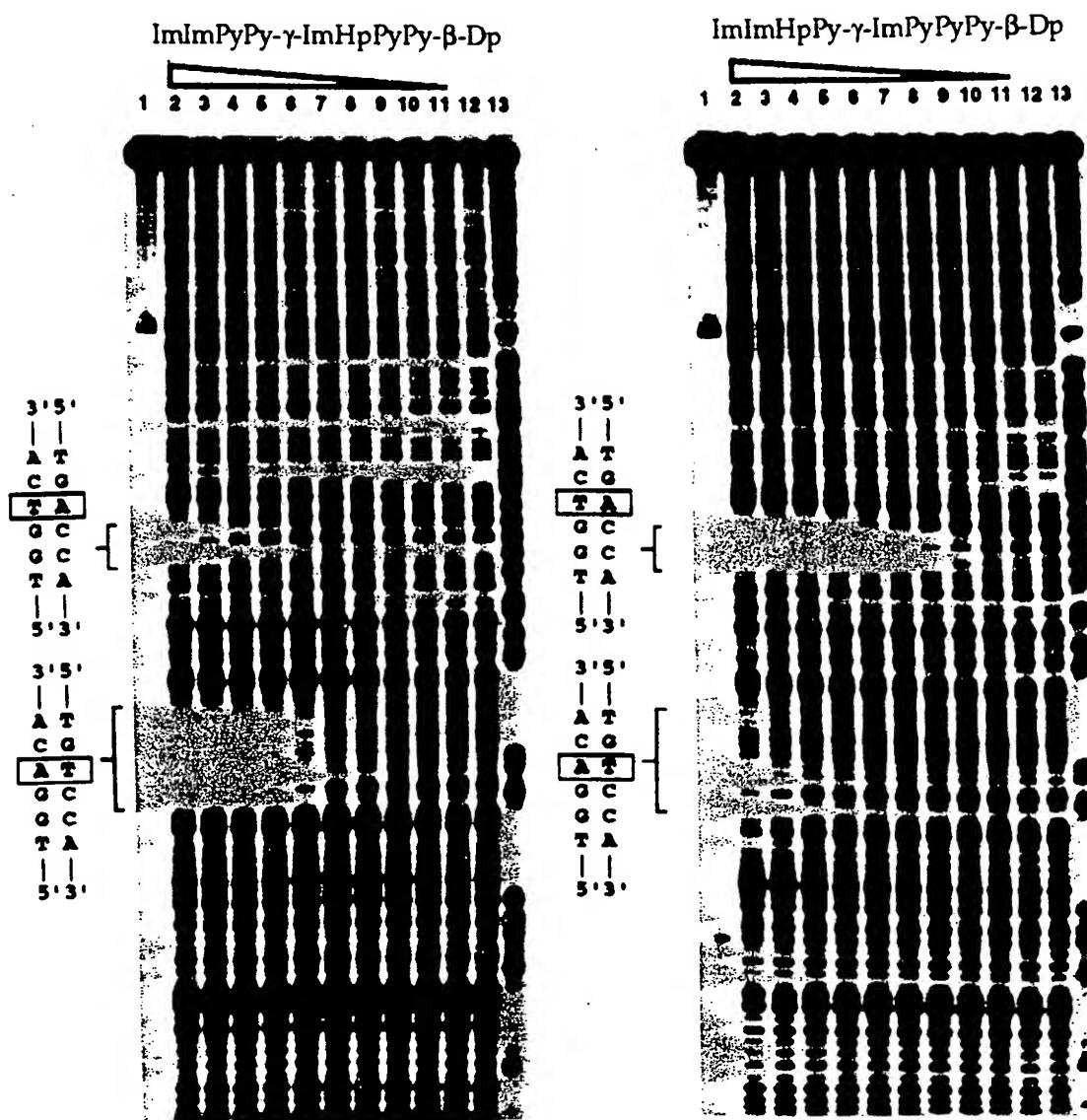
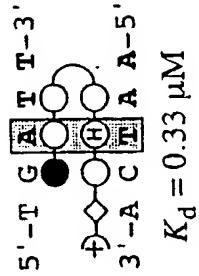
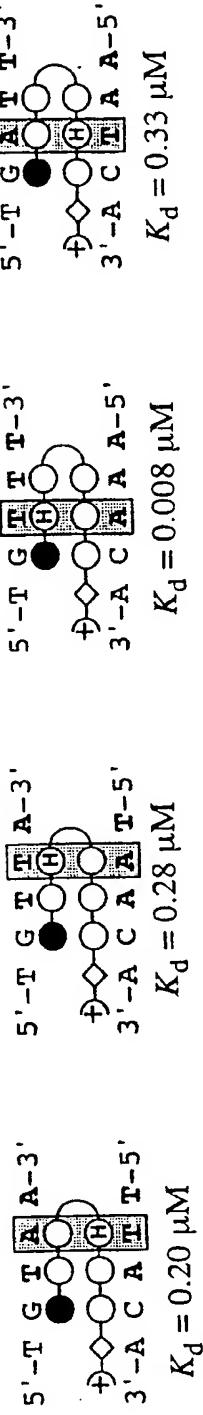
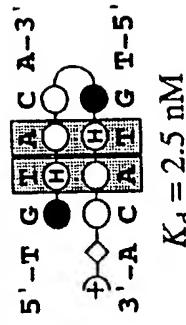
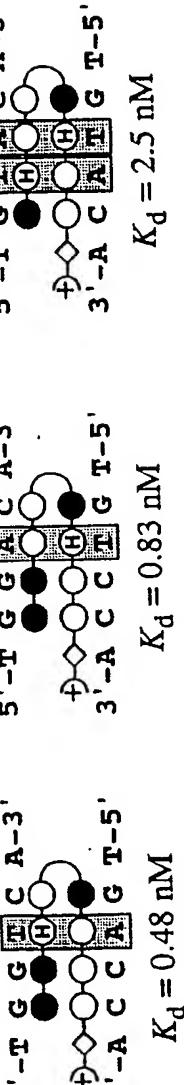


FIG. 3

6-Ring Hairpin Hp-Py-Im-Polyamides**8-Ring Hairpin Hp-Py-Im-Polyamides****10-Ring Hairpin Hp-Py-Im-Polyamides****FIG. 4**

5 / 14

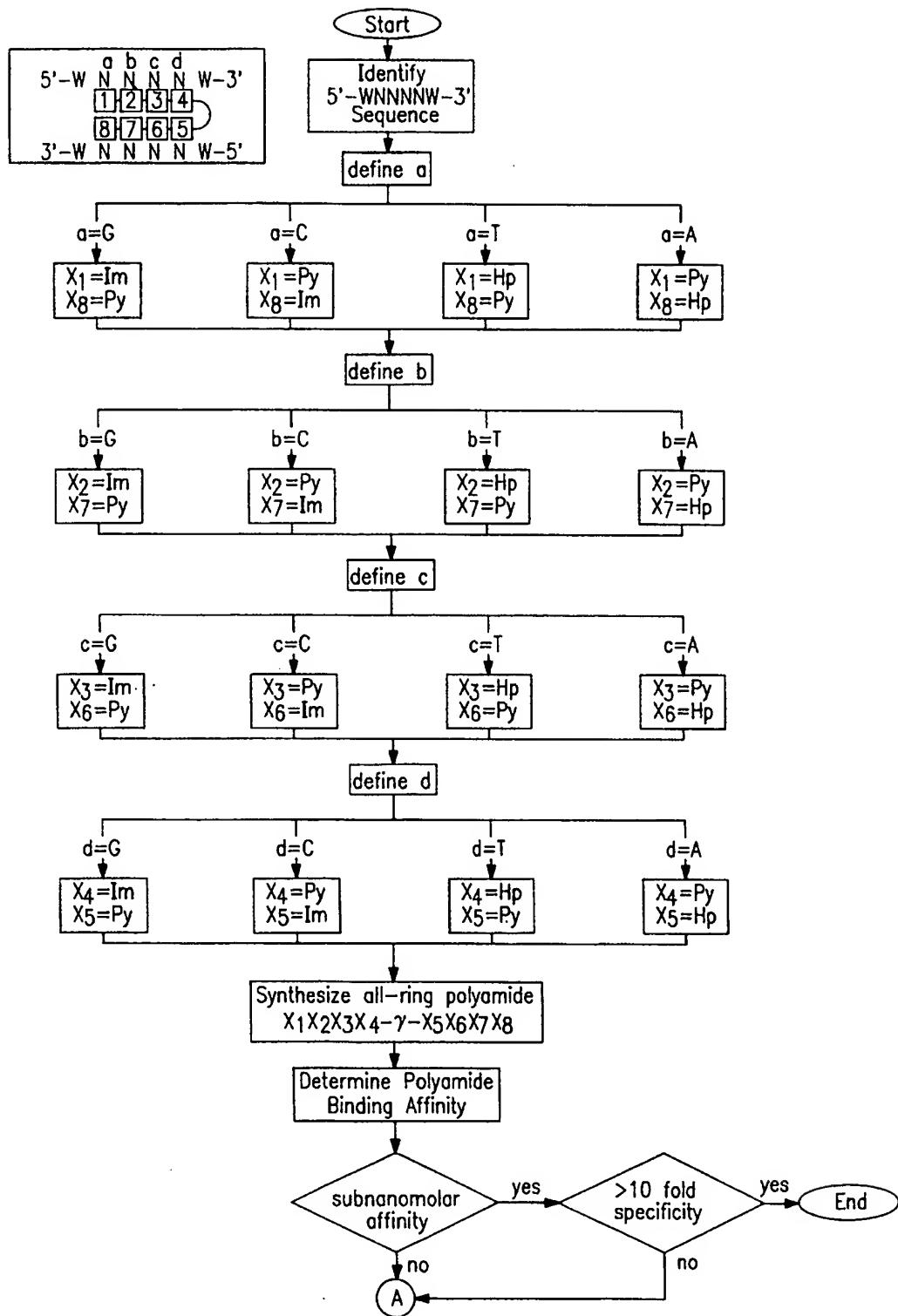


FIG. 5
SUBSTITUTE SHEET (RULE 26)

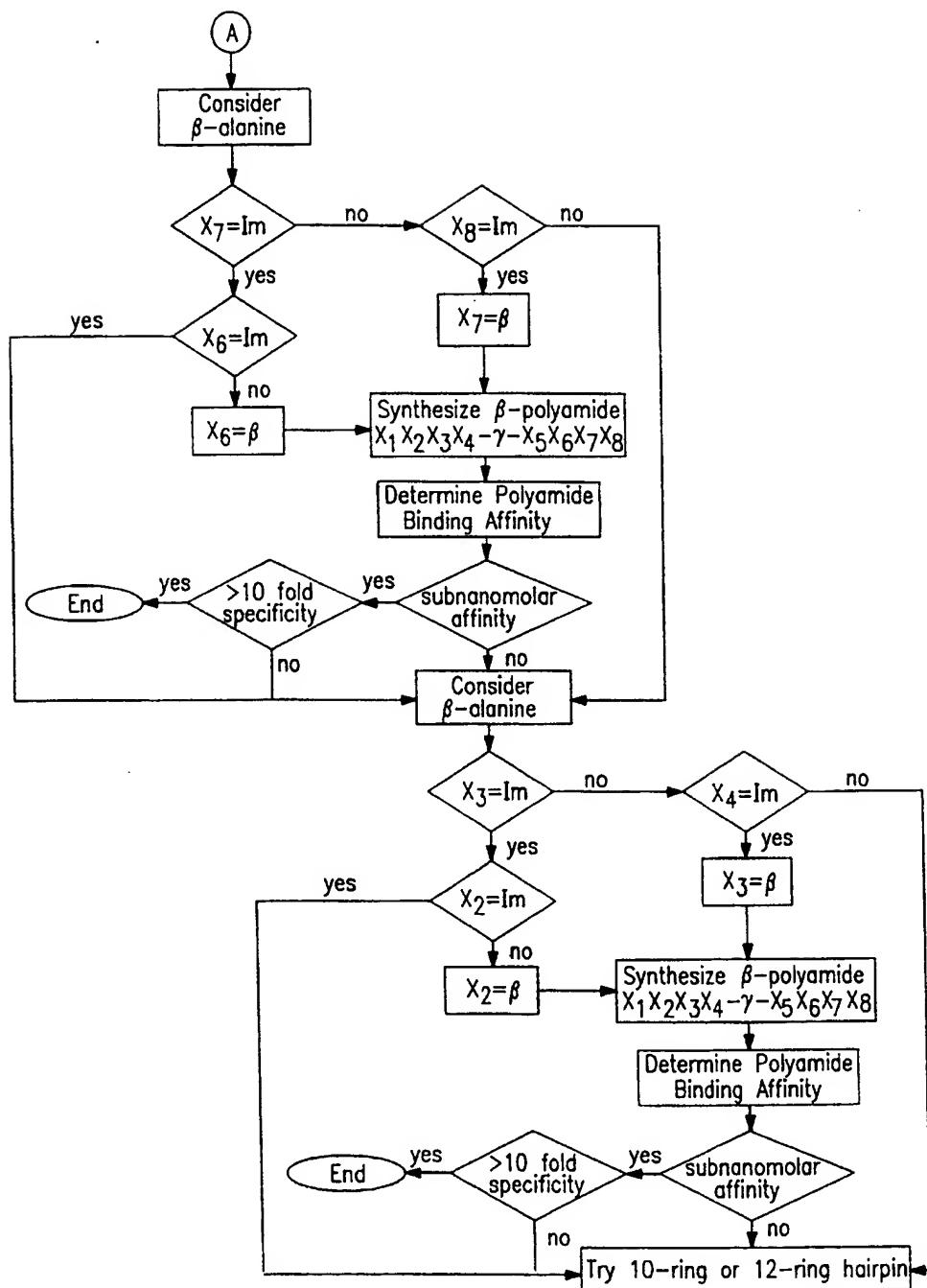


FIG. 6

7 / 14

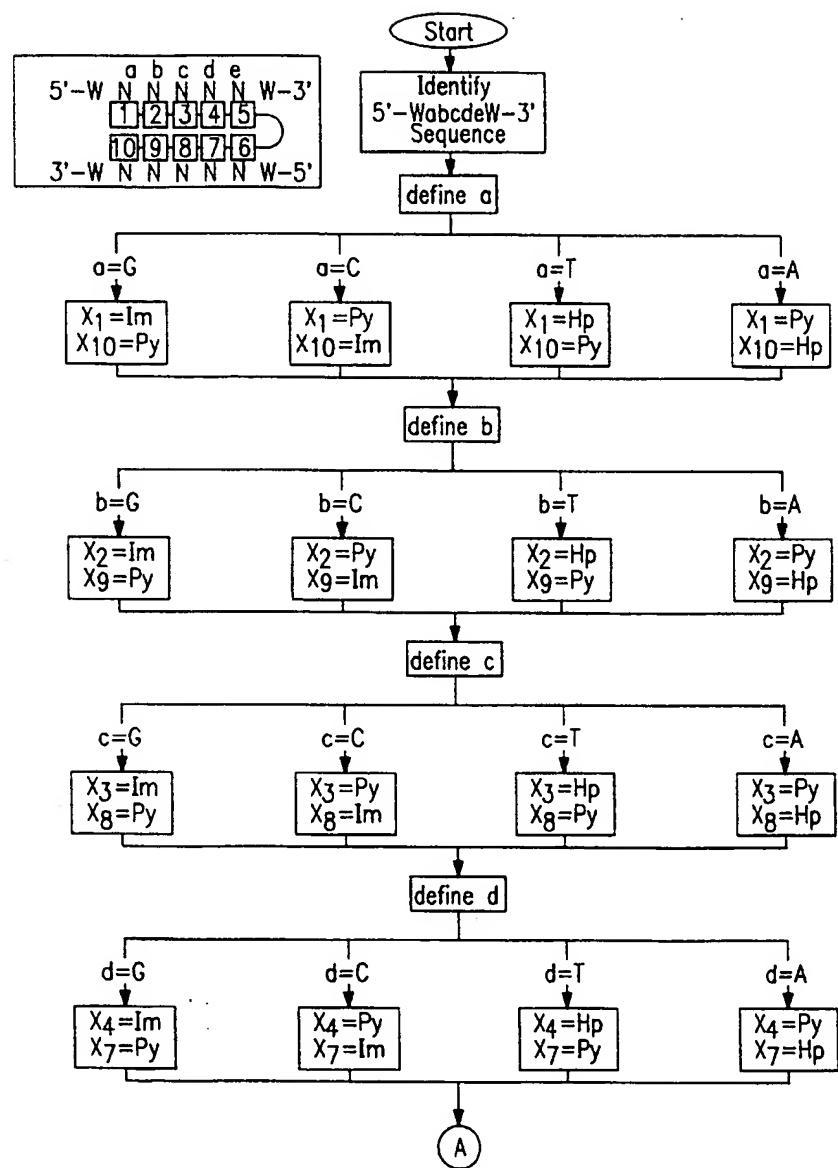


FIG. 7A

8 / 14

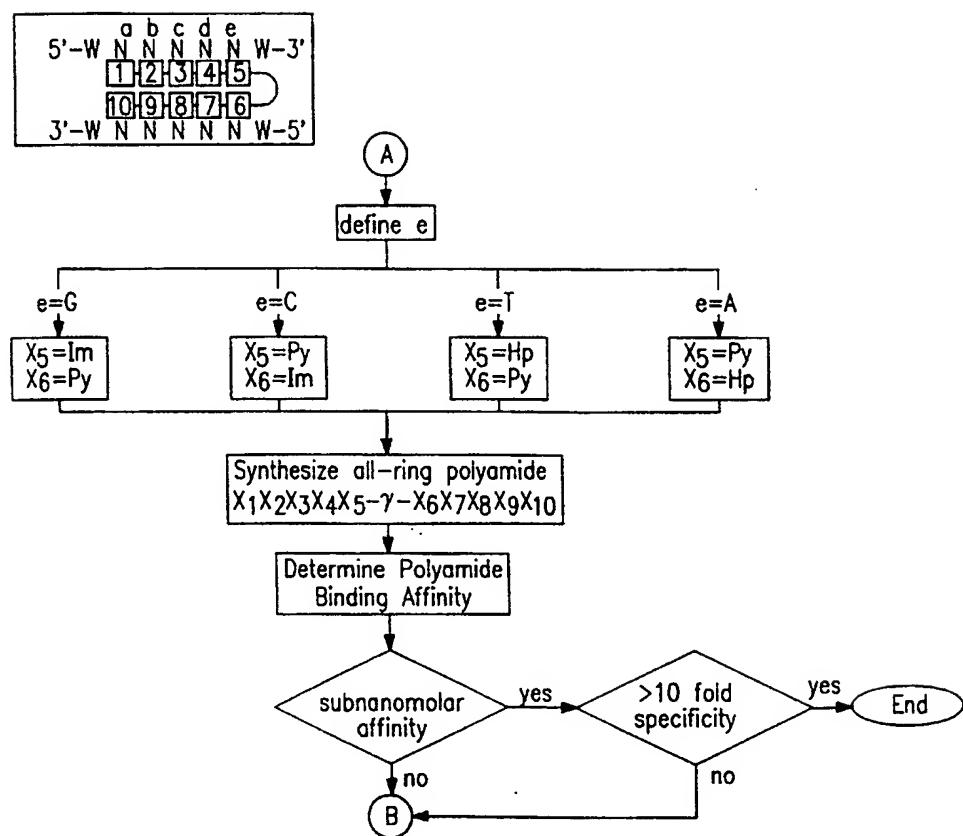


FIG. 7B

9 / 14

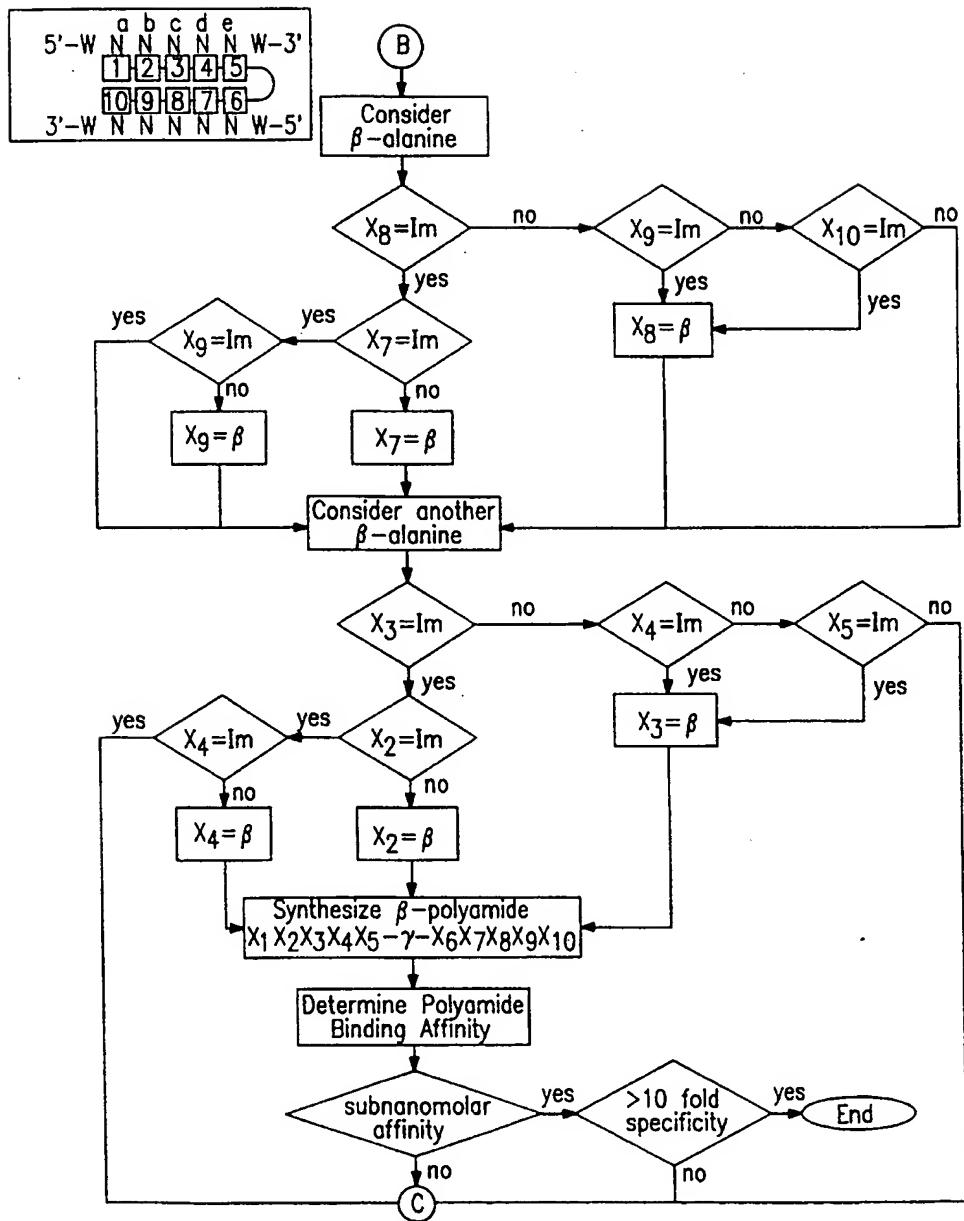


FIG. 8

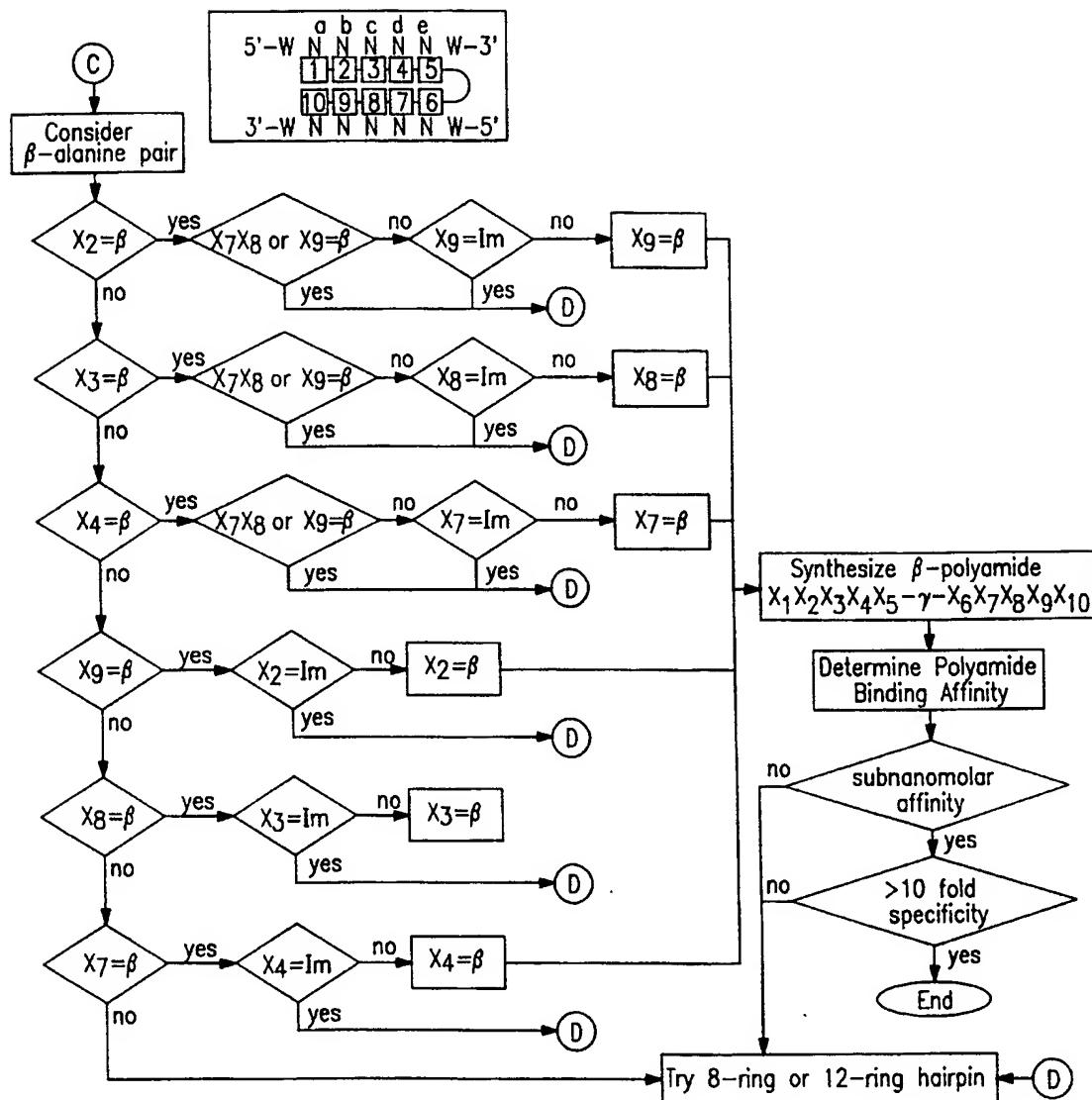


FIG. 9

11 / 14

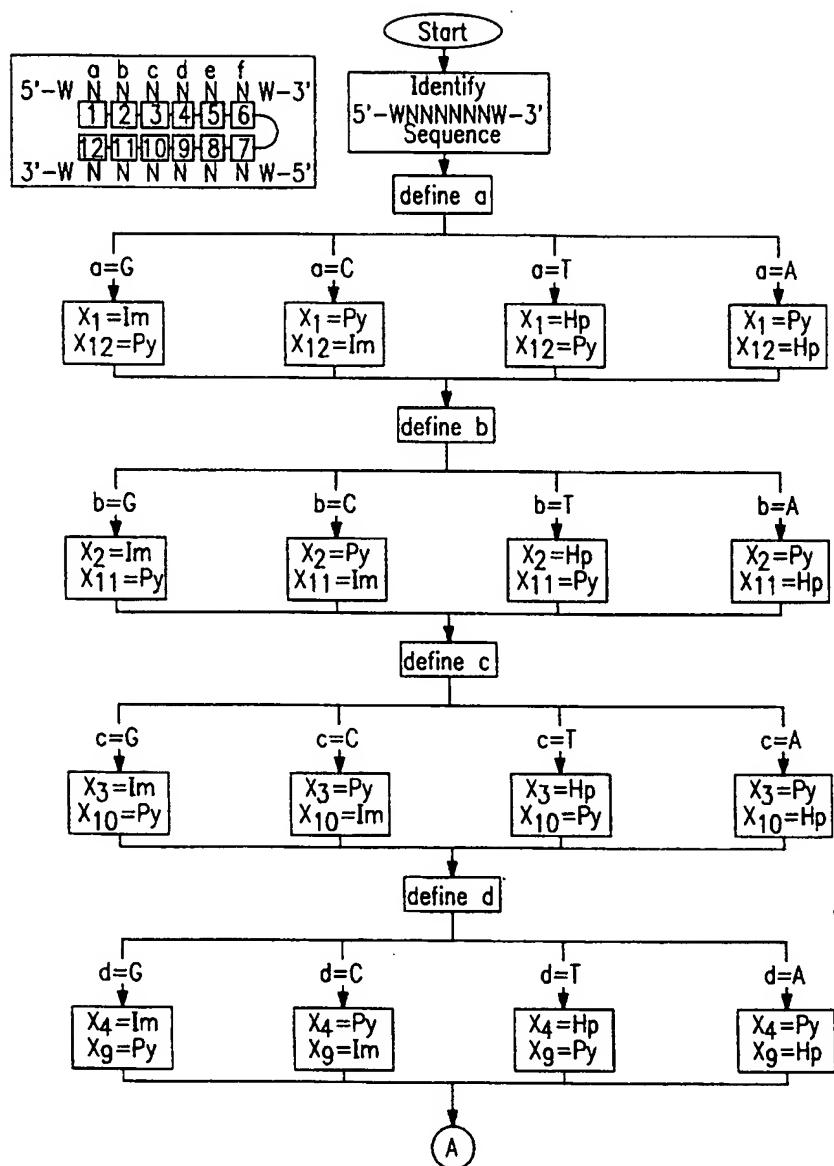


FIG. 10A

12 / 14

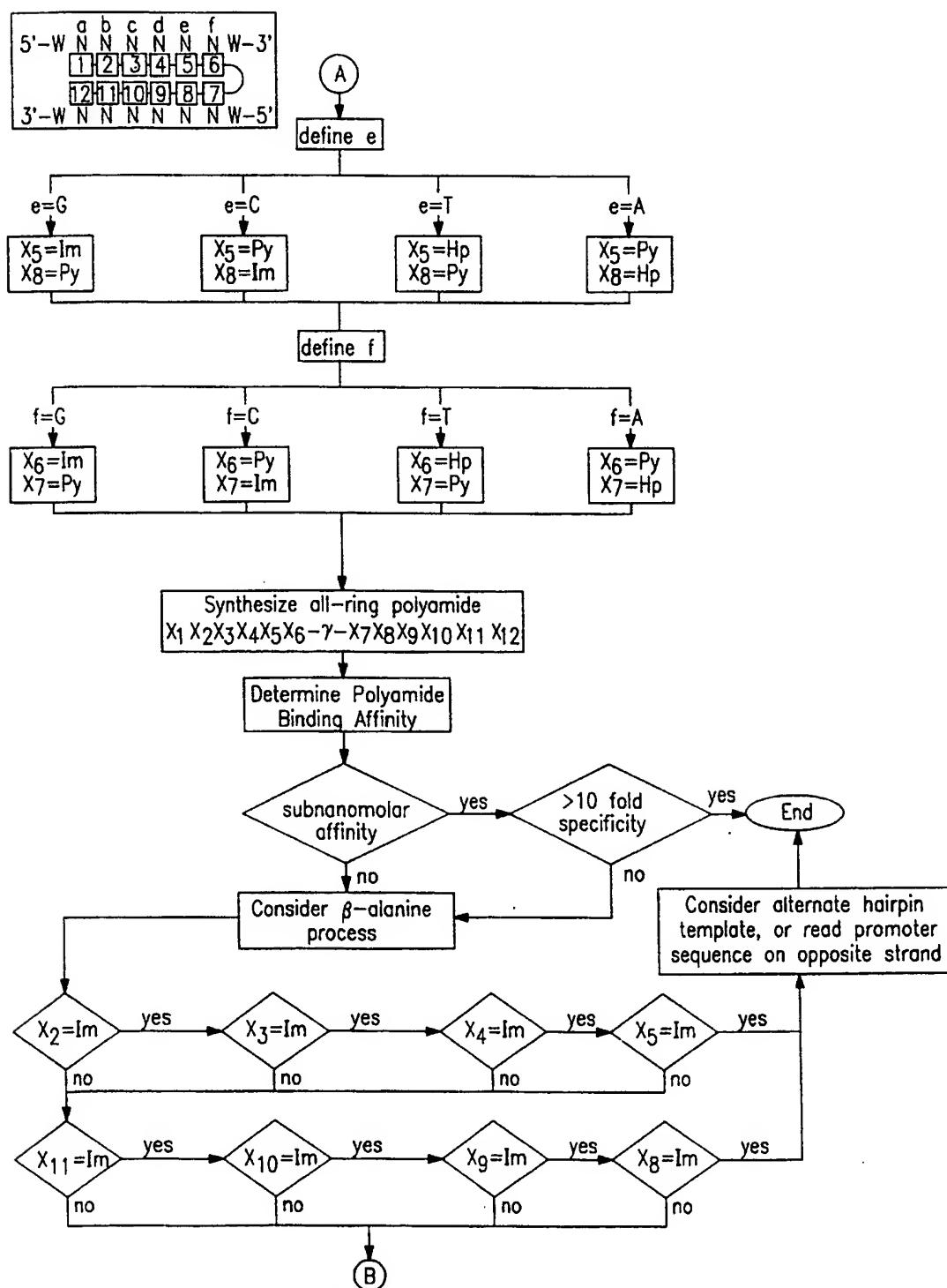


FIG. 10B

13 / 14

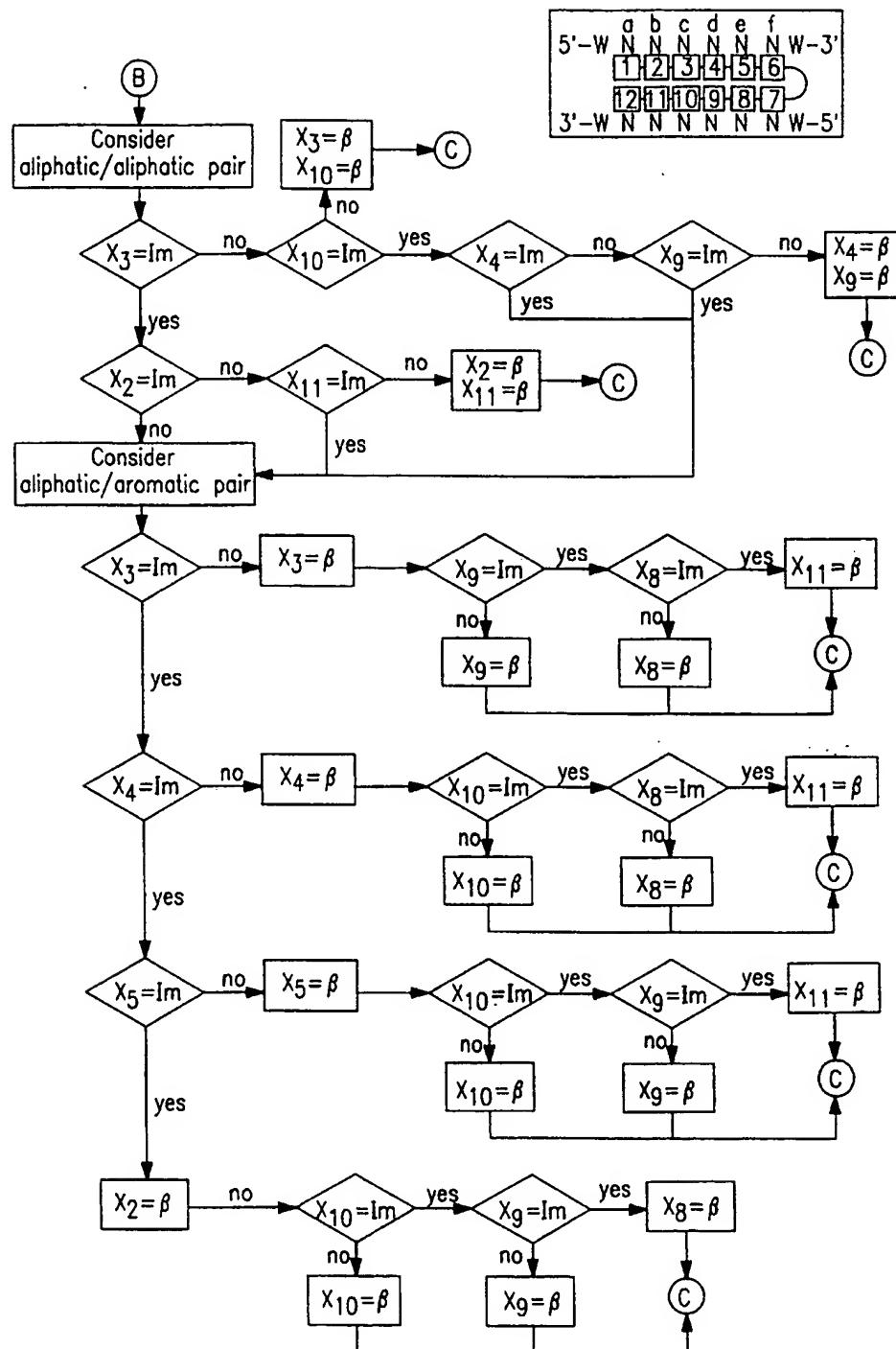


FIG. II A

14 / 14

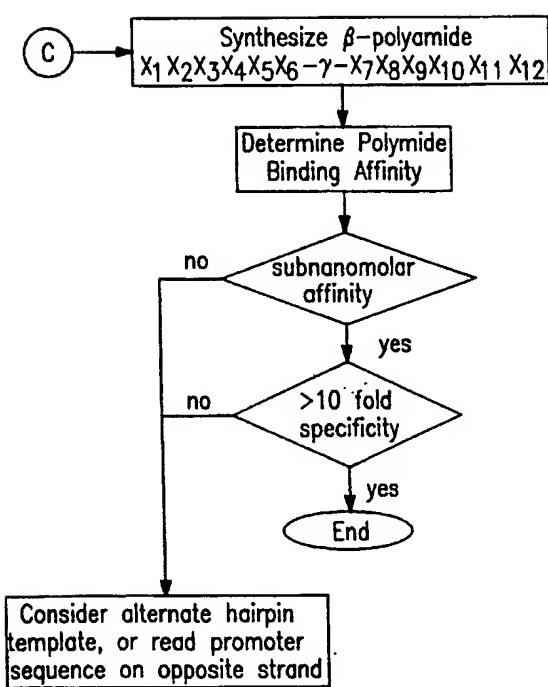


FIG. IIB

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/01714

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C07D207/34 C07D233/90 A61K31/415 C07D403/14 C12Q1/68

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C07D A61K C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	J. W. TRAUGER ET AL: "Recognition of DNA by designed ligands at subnanomolar concentrations" NATURE, vol. 382, no. 6591, 8 August 1996, pages 559-561, XP002066256 cited in the application see the whole document ---	1-12, 42-48
X	E. B. BAIRD ET AL: "Solid phase synthesis of polyamides containing imidazole and pyrrole amino acids" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 26, July 1996, pages 6141-6146, XP000674666 cited in the application see page 6141 - page 6142 ---	1-5, 42-48
	-/-	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

28 May 1998

Date of mailing of the international search report

12.06.98

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Voyiazoglou, D

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 98/01714

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	S. E. SWALLEY ET AL: "Recognition of a 5'-(A,T)GGG(A,T)2-3' sequence in the minor groove of DNA by an eight-ring hairpin polyamide" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 35, 4 September 1996, pages 8198-8206, XP002066377 see page 8198 - page 8202 ----	1-12, 42-48
X	M. E. PARKS ET AL: "Optimization of the hairpin polyamide design for recognition of the minor groove of DNA" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 26, July 1996, pages 6147-6152, XP000674668 see page 6147 - page 6148 ----	1-5, 42-48
X	M. E. PARKS ET AL : "Recognition of 5'-(A,T)GG(AT)2-3' sequences in the minor groove of DNA by hairpin polyamides" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 118, no. 26, July 1996, DC US, pages 6153-6159, XP000674667 see page 6153 - page 6155 ----	1-5, 42-48
P,X	S. E. SWALLEY ET AL : "Discrimination of 5'-GGGG-3', and 5'-GGCC-3' sequences in the minor groove of DNA by eight-ring hairpin polyamides" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, vol. 119, no. 30, 30 July 1997, DC US, pages 6953-6961, XP002066260 see page 6959 - page 6961 ----	1-12, 42-48
P,X	W. L. WALKER ET AL: "Estimation of the DNA sequence discriminatory ability of hairpin-linked lexitropsins" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, U.S.A., vol. 94, no. 11, May 1997, pages 5634-5639, XP002066261 see table 1 ----	1-12, 42-48
A	WO 96 05196 A (PHARMACIA) 22 February 1996 see claim 1 -----	1-12, 16-40, 42-48

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 98/01714

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: 13-15, 41 because they relate to subject matter not required to be searched by this Authority, namely:
The claim is so broad that for determining the scope of a meaningful search due account has been taken of rule 33.3 PCT; special emphasis was put on the following subject-matter: claims 1-12, 16-40, 42-48; pages 1-22; figures
2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 98/01714

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9605196	A 22-02-1996	AU	689623 B	02-04-1998
		AU	3113695 A	07-03-1996
		CA	2172629 A	22-02-1996
		CN	1131946 A	25-09-1996
		EP	0722446 A	24-07-1996
		FI	961506 A	05-06-1996
		HU	76267 A	28-07-1997
		JP	9504039 T	22-04-1997
		NO	961377 A	30-05-1996
		NZ	290404 A	24-04-1997
		PL	313821 A	22-07-1996
		ZA	9506590 A	18-03-1996